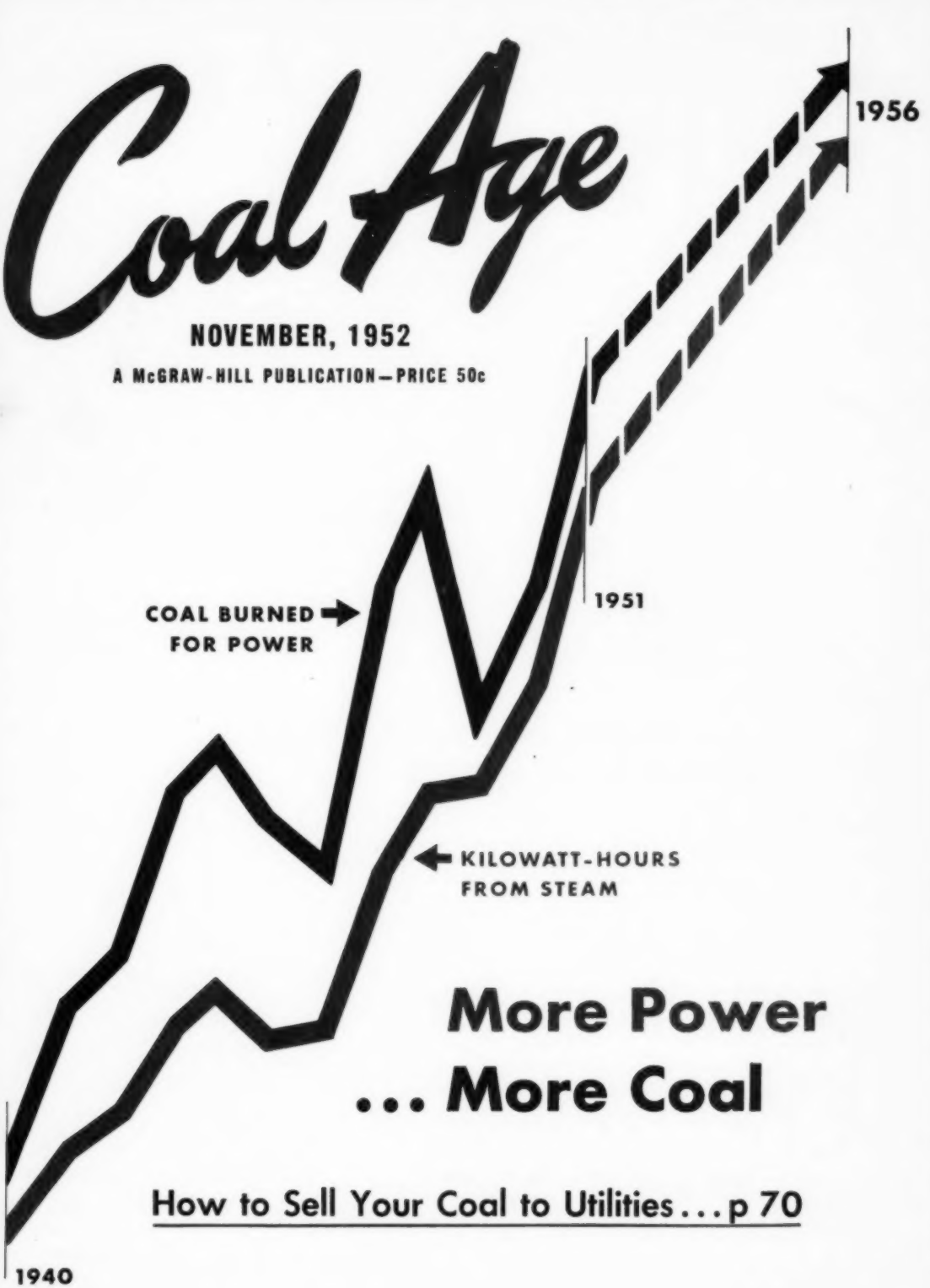
Coal Age

NOVEMBER, 1952

A McGRAW-HILL PUBLICATION—PRICE 50c



More Power ... More Coal

How to Sell Your Coal to Utilities ... p 70

OPERATORS GET A

DAILY 'BONUS TRIP'

with DROP BOTTOM MINE CARS

The unloading speed of A.C.F. Drop Bottom Mine Cars means an extra round trip every day. How many extra tons could this mean to you? As each car passes over the unloading point, it unloads itself automatically. Then the doors close and latch—also automatically! In less than 2 minutes, the trip has unloaded and is on its way back to the face. In addition, the fast automatic dumping of A.C.F. Drop Bottom Mine Cars keeps storage hoppers filled to provide continuous operation of your preparation plant. Simple! Speedy! Yet, the time saved means extra tonnage—every day. Your nearby A.C.F. Representative has all the facts and figures on Drop Bottom Mine Cars. American Car and Foundry Company, New York · Chicago · St. Louis Cleveland · Washington · Philadelphia · San Francisco Huntington, W. Va. · Berwick, Pa.

a.C.f.

MINE CARS

for Constant Haulage

Only B. F. Goodrich makes the grommet belts that cut costs 20 to 50%!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

". . . within a few days ordinary belts had stretched . . . After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all . . ."

"Ordinary belts lasted only 5 or 6 weeks . . . B. F. Goodrich grommet belts are in their sixth month of service . . ."

"Previous belts suffered from shock loads, wore out fast . . . BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

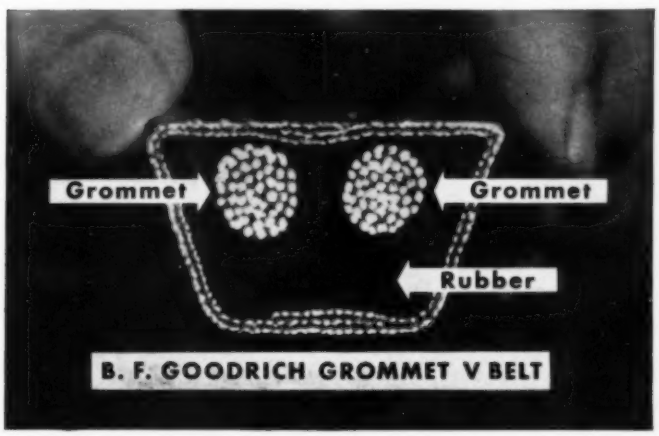
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly

Grommet V-Belts BY

B.F.Goodrich

RUBBER FOR INDUSTRY



The B. F. Goodrich Company
Dept. CA-11
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

Name_____

Firm Name_____

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WHERE LIFE IS AT STAKE

No matter how efficient his equipment, it takes specialized skill for a deep sea diver to do his work in safety . . . his life depends on his experience and know-how.

HULBURT OIL & GREASE COMPANY

Specialists in Coal Mine Lubrication

PHILADELPHIA, PA.

Specialized Skill COUNTS

—and the same applies to

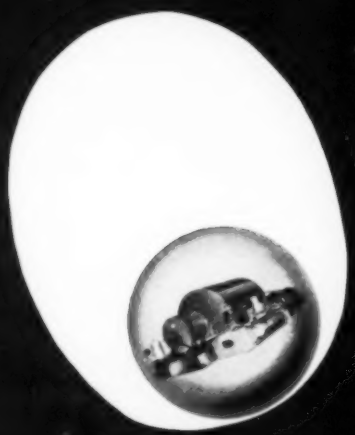
COAL MINING MACHINERY

Hulburt *Quality* GREASE

No matter how efficient your coal mining machinery, its life depends on the right kind of lubricant, applied the right way. You can depend on Hulburt Quality Grease to protect the life of coal mining machinery because of the specialized skill that produces this grease for this one special purpose . . . and Hulburt Engineers are ready with the know-how to show you how to use it correctly.

You're Looking At The Two Best Ways To Get Out From Under

FINE COAL DEWATERING PROBLEMS



The BIRD COAL FILTER — gets washed fine coal as dry as can be done by any mechanical means, without losing valuable coal — handles a ton or more a minute at seven cents or less a ton — keeps on running for months at a time without a hitch.

The BIRD POLISHER sets up a simple system for taking the fine, high ash particles out of the water and putting the water in shape for re-use. You effect a closed circuit. No more pollution headaches.

Better look into these BIRDS.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Coal Age

NOVEMBER • 1952

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THIS MONTH'S COVER

POWER CAPACITY of public utilities is slated for a 56% boost by the end of 1956. That's one of the reasons *Coal Age* asked the coal buyer of a big power company to tell its readers what factors govern his purchases, how one coal is picked over another and how coal men should go about "Selling Coal for Power" (p 70). Coal men responsible for mining, preparation and marketing will find this frank, fact-packed article a practical, profitable help. Even if you're not responsible for setting your company's policies, you'll enjoy it as interesting and informative—and well worth reading.

Attend the UMWA Convention

. . . **Probably not, we know!** Ivan Given, *Coal Age* Editor, went though —mainly to see if he could get a line on what the boys were cooking up for the future. His first-hand report based on listening and probing begins on p 134 and is another "you-shouldn't-miss" feature in this issue.

Not a Regular Sports Section!

. . . **But the World Series review** in this month's *Foremen's Forum* (p 106) may bring back some pleasant, or otherwise, recollections. In addition to its value in pointing up important leadership qualities—the real purpose, of course—we hope you get as much enjoyment out of reading it as our editor had in writing it.

A Special Service This Month

. . . **If you use conveyors underground,** be sure to note the roundup of free literature on p. 124, prepared as a useful checklist of all available catalogs and bulletins. To get any of them, use the postage-free card facing the listing.

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COAL AGE NOVEMBER, 1952
VOLUME 57 NUMBER 11
(with which are combined The Colliery Engineer and Mines and Minerals)

Published monthly on the 1st by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. Member ABC and ABP. **Publication Office:** 1309 Noble St., Philadelphia 23, Pa.

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Curtis W. McGraw, President; Willard T. Chevalier, Executive Vice President; Joseph A. Gerardi, Vice President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Nelson Bond, Vice President and Director of Advertising; J. E. Blackburn, Jr., Vice President and Director of Circulation.

Subscriptions: Address all correspondence to COAL AGE—Subscription Service, 1309 Noble St., Philadelphia 23, Pa., or 330 W. 42nd St., New York 36, N. Y.

A McGRAW-HILL PUBLICATION

Member of Associated Business Publications and Audit Bureau of Circulations

Allow 1 month for change of address. Subscriptions are solicited only from management, production and maintenance executives and engineers in the coal-mining industry. Position and company connection must be indicated on subscription orders.

Single Copies: U. S. and possessions and Canada, 50c; all other countries, $1.50.

Subscription rates: United States and possessions, $5 for one year, $8 for two years, $10 for three years. Canada $6 for one year, $10 for two years, $12 for three years. Other Countries in the Western Hemisphere, $10 for one year, $16 for two years, $20 for three years. All other countries, $15 for one year, $25 for two years, $30 for three years.

Entered as second class matter May 4, 1951, at the Post Office, Philadelphia, Pa., under the Act of March 3, 1879. Printed in U. S. A.

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COAL AGE articles are indexed regularly by Engineering Index, Inc. COAL AGE'S own index is published annually in December.

Branch Offices and District Managers: Atlanta 3, B. C. Maultsby; Chicago 11, C. J. Cosh; Cleveland 15, W. M. Spears; Dallas 1, J. H. Cash; Los Angeles 17, C. W. Dysinger; New York 36, T. E. Alcorn and J. B. Lewis (New York and New England); Philadelphia 3, W. A. Potter; Pittsburgh 22, H. C. Chellson; St. Louis 1, P. W. Rawls; San Francisco 4, J. W. Otterson; Boston 16; Washington 4; McGraw-Hill House, 95 Farringdon St., London E. C. 4.

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SET NEW LOWS FOR BEARING MAINTENANCE COSTS . . .

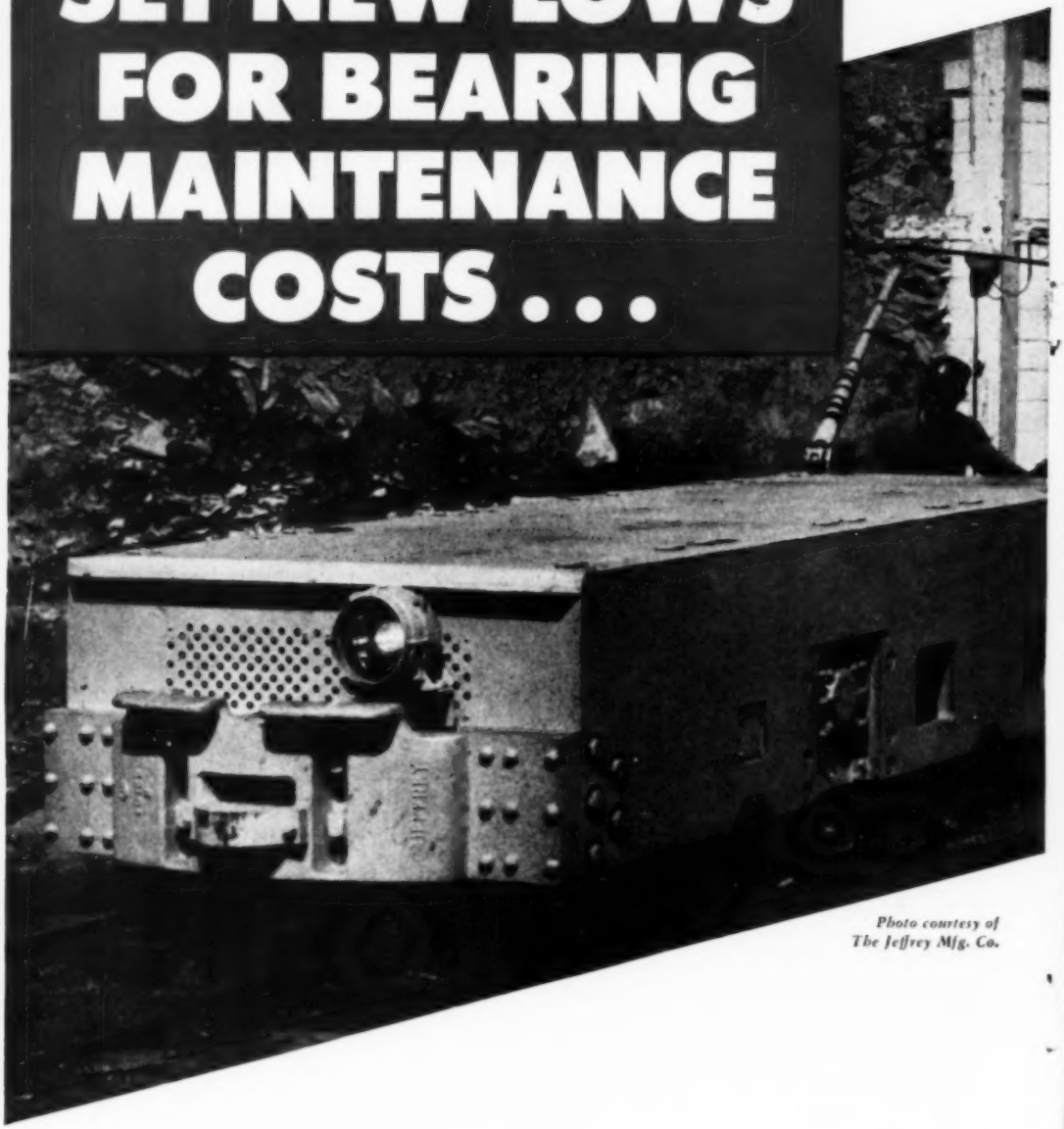


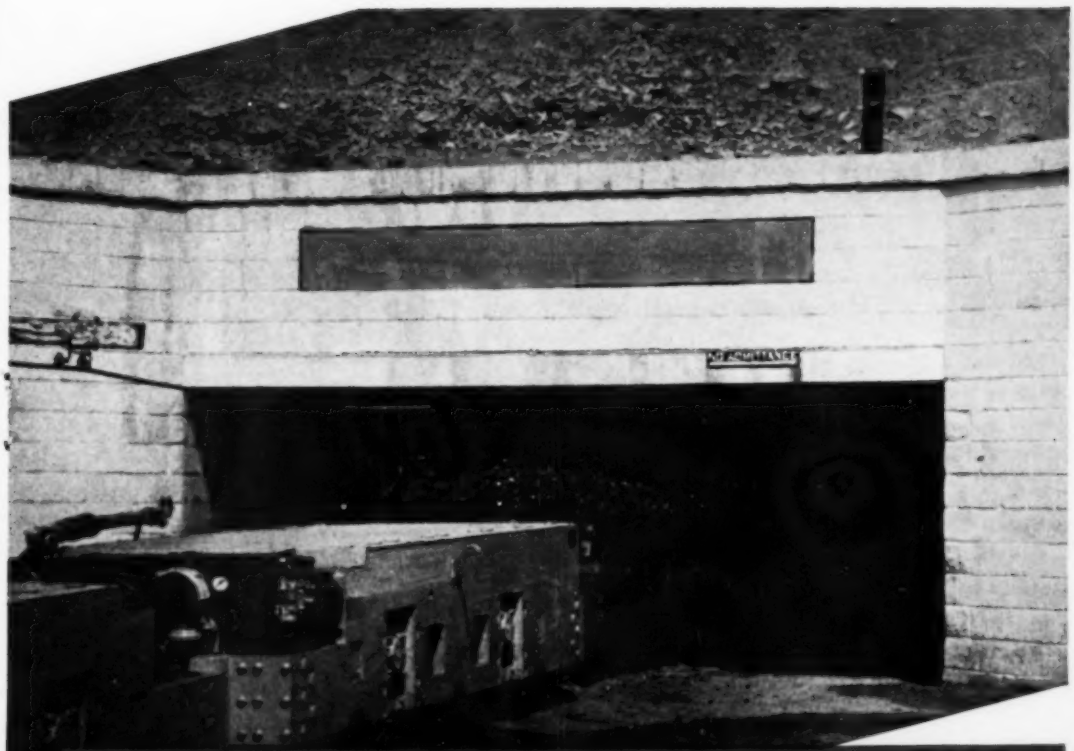
Photo courtesy of The Jeffrey Mfg. Co.

TUNE IN:
Tuesday nights
on television —
the TEXACO STAR THEATER
starring MILTON BERLE.

See newspaper for
time and station.

TEXACO

TEXACO LUBRICANTS



with TEXACO REGAL STARFAK

In mines where *Texaco Regal Starfak* is used for grease-lubricated ball and roller bearings, maintenance costs have come down and bearing life has gone up. Premium-quality *Texaco Regal Starfak* far outperforms ordinary grease in resistance to oxidation and ability to stand up under all high-speed operating conditions.

Texaco Regal Starfak is a longer lasting lubricant, too. It does not separate in use or in storage, and does not leak out of bearings. It has low internal friction . . . keeps bearing temperatures normal . . . assures greater equipment availability.

In mine car wheel bearings of all types, use *Texaco Olympian Grease*. It assures easier starts in cold weather, stays *in* the bearings, assures smoother operation. And — the protection lasts.

There are Texaco Lubricants to step-up the efficiency of all mine machinery. Let a Texaco Lubrication Engineer tell you about them. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

Faithfully yours 50 *for Fifty Years*

On saved shifting time alone

YOU CAN GAIN UP TO 25

THE NEWEST, FINEST LINE ON EARTH!

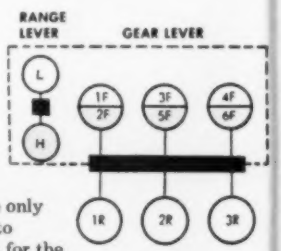
HD-5	HD-9	HD-15	HD-20
40 drawbar hp., 11,250 lb.	72 drawbar hp., 18,800 lb.	109 drawbar hp., 27,850 lb.	Hydraulic Torque Converter Drive, 175 net engine hp., 41,000 lb.

PERCENT MORE PRODUCTION

WITH THE MODERN SHIFT PATTERN ON ALLIS-CHALMERS HD-9 AND HD-15 TRACTORS

It takes just half the time and effort to change from low forward to fast reverse with the Allis-Chalmers HD-9 and HD-15 transmission. This shifting time saved becomes production time gained on bulldozing and other jobs calling for a short forward-backward cycle. For example, job studies prove that on backfilling, pusher work, working around large excavators, digging and loading with front-end shovels—other jobs where frequent shifts are required—you can make five passes in the time usually required to make four...actually increase production up to 25 percent.

Here's how it works



You go from any forward to any reverse speed with one simple shift of the gear lever. The only time you touch the range lever is to select the forward range you want for the job to be done—just set it and forget it.

The constant-mesh Allis-Chalmers transmission makes shifting smooth and effortless...without gear clashing. And it's so easy that the operator can *always* take advantage of high-speed reverse.

This exclusive shift pattern, together with all-steel welded construction, unit assembly, 1,000-hour lubrication, are just a few of the reasons you get more work done with the new *designed-for-your-job* Allis-Chalmers tractors.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

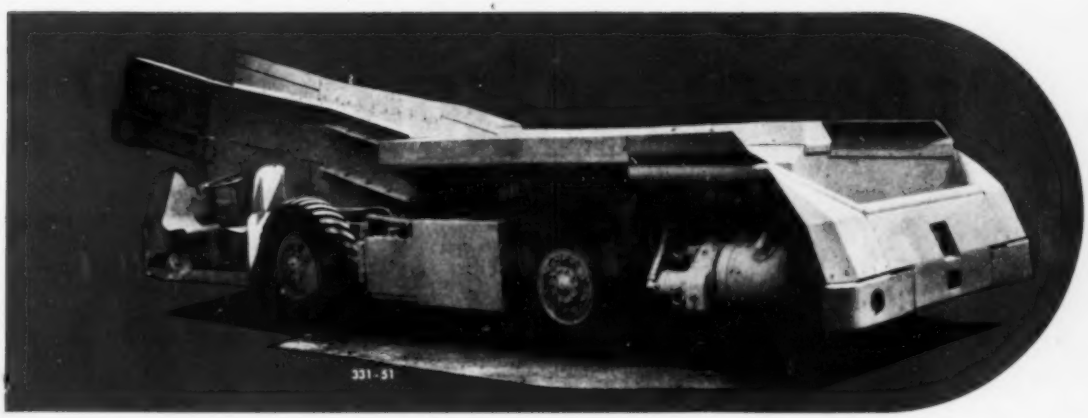
82-51

Jeffrey Shuttle Car discharging into the end of a Jeffrey Belt Conveyor.

Moves Coal Faster JEFFREY at Lower Cost

Jeffrey Shuttle Car discharging into a Jeffrey Belt Conveyor from the side.

86-51



JEFFREY SHUTTLE CARS are designed and built to speed coal haulage between loader and conveyor or mine cars. Experience has proved that they have approached more nearly continuous operation than any system developed to date.

Model shown above features an elevating front section which permits coal to be discharged directly into mine cars or lowered for discharge into main haulage conveyors. This feature often eliminates necessity for an elevating conveyor unit to handle coal between Shuttle Car and main haulage.

SHUTTLE CARS

(Patented)

These cars are available in several heights—capacities from 3½ to 6½ tons. Of the cable reel type, they are available with either two or four-wheel drive and steering.

The added flexibility they give to your operation, plus the high production and low cost per ton they afford, is worthy of your investigation and consideration. For counsel about transportation methods, there is an experienced Jeffrey Engineer who will be happy to serve.

THE JEFFREY MANUFACTURING COMPANY Established 1877

912 North Fourth St., Columbus 16, Ohio

1877 75 1952

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"CONSOLIDATION COAL"

...with 2 rubber-tired Tournadozers

Consolidation Coal Company, (Ky.), a division of Pittsburgh Consolidation Coal Company, operates 4 mines and 2 preparation plants within a 20-mile radius of their offices at Jenkins, Kentucky. One of their 2 rubber-tired C Tournadozers handles all clean-up work at their "Beefhide" spread . . . the second "C" is on standby duty to handle emergency jobs at *all four* mines and the Jenkins Preparation Plant. This rubber-tired unit drives to the scattered job locations under its own power . . . travels over paved highways, limestone and red-dog surfaced mine roads, across tracks, up and down 20% grades at speeds up to 19 m.p.h. It is ready to go *anywhere* at a moment's notice. No blocking, loading or unloading delays at any time! With high speeds on rubber, it puts spare time to work . . . drains refuse areas . . . strips overburden . . . hauls equipment on low-bed trailers . . . handles many other odd jobs.

Saves 1" to 2" of coal on clean-up work

On clean-up assignments, Tournadozer's low-pressure tires reduce coal waste . . . don't dig coal into the ground or grind it into unrecoverable fines. At the "Beefhide" mine, for example, Consolidation's Tournadozer saves an estimated 1" to 2" of coal on its continuous cleaning operation.

Mobile Tournadozer gives "Consolidation" important *mechanical* advantages, too! 186 h.p. engine and 4-wheel drive put plenty of power behind the rugged 2½-yard blade. Instant-shift selection of 4 forward speeds saves vital momentum . . . lets operator drift loads in higher gears. Reverse speeds to 8 m.p.h. cut non-productive time on return half of cycle for more passes per hour. Big 21.00 x 25 low-pressure tires give plenty of sure-footed traction in soft material. Powerful 4-wheel, disc-type air brakes assure fast, safe control at all times.

Your LeTourneau Distributor will be glad to show you the Tournadozer in action, so you can judge these advantages for yourself. Call him next time you're considering dozers.

Tournadozer—Trademark Reg. U. S. Pat. Off. D-32-CM

R. G. LeTOURNEAU, INC.
Peoria, Illinois

HIGH-SPEED, RUBBER-TIRED EXCAVATING

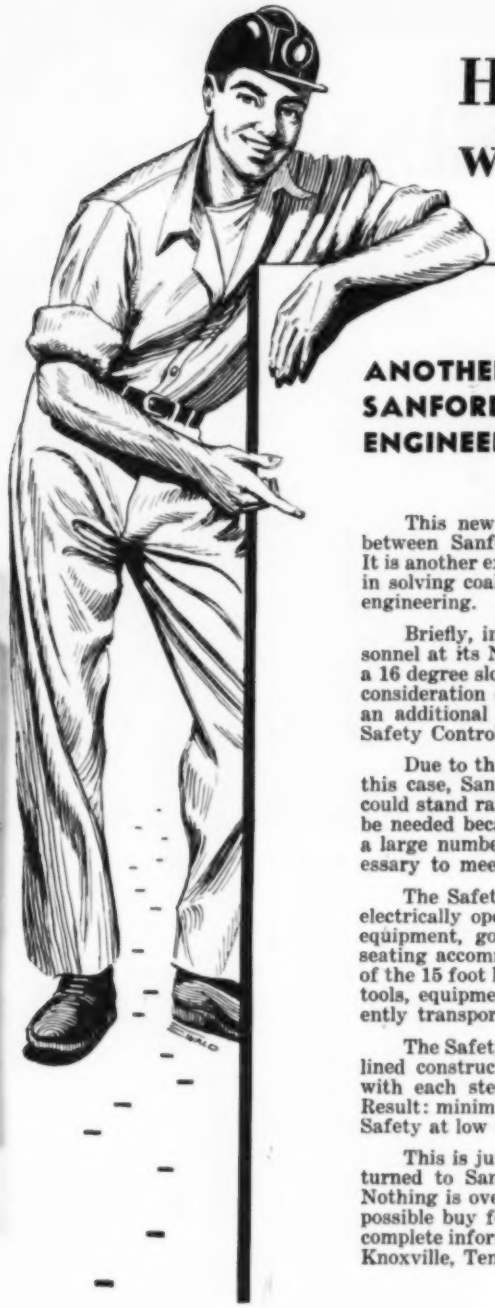
SERVICES 4 MINES...

Mileage to each mine is from Jenkins, Ky.

At the Hendrix mine slate dump, Tournadozer pushes its load of truck-dumped slate 75' in 2nd gear (3.7 m.p.h.) . . . returns to dumping point in high reverse (8 m.p.h.).

Tournadozer works on loose spoil banks or hard-packed coal seams without damaging coal surface . . . completes dozing cycles in ⅓ to ½ the time required by crawler-tractors.

HAULING • LIFTING EQUIPMENT



Here's the Story on with Safety Control

ANOTHER GOOD EXAMPLE HOW SANFORD-DAY'S PRACTICAL CAR ENGINEERING CAN SAVE YOU MONEY

This new development is the result of close collaboration between Sanford-Day and Peabody Coal Company engineers. It is another example of Sanford-Day's ability and aggressiveness in solving coal operators' high cost problems with practical car engineering.

Briefly, in this case, Peabody needed cars to transport personnel at its No. 10 Mine. The cars were to operate by cable on a 16 degree slope. Safe transportation was the first and foremost consideration of Peabody officials. In order to achieve this end, an additional car incorporating all safety features, called the Safety Control Car, was designed.

Due to the relatively short haul and available head room in this case, Sanford-Day designed a man car in which personnel could stand rather than be seated. This meant fewer cars would be needed because this car accommodates from 36 to 45 men—a large number for this size car. Only two man cars were necessary to meet Peabody's transportation problem.

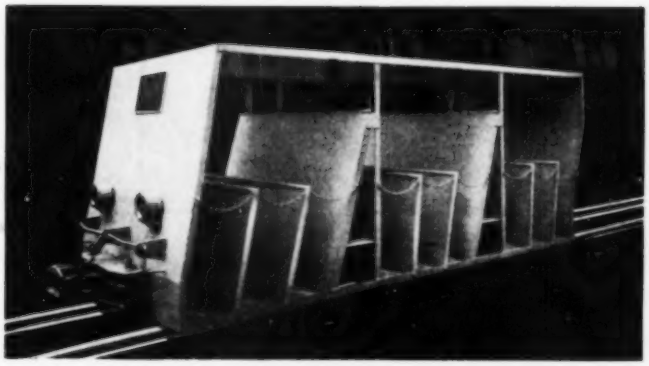
The Safety Control Car was developed with three pairs of electrically operated magnetic shoe brakes, batteries, generator equipment, governor and automatic switch control. There are seating accommodations for four men with the greater portion of the 15 foot long by 7 foot wide platform available for handling tools, equipment, supplies, etc. This car also operates independently transporting supplies and maintenance personnel.

The Safety Control Car and Man Cars have no costly streamlined construction. They are compact all-steel functional units with each steel member an integral part of the frame work. Result: minimum manufacturing cost which means you pay less. Safety at low cost has been the important factor.

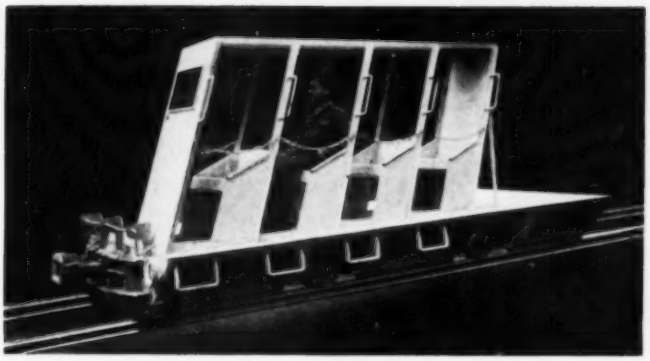
This is just one of hundreds of cases where an operator has turned to Sanford-Day for a practical solution to a problem. Nothing is overlooked to make Sanford-Day Man Cars your best possible buy for safe and efficient personnel transportation. For complete information, write to us today. Sanford-Day Iron Works, Knoxville, Tenn.

SANFORD-DAY IRON WORKS,

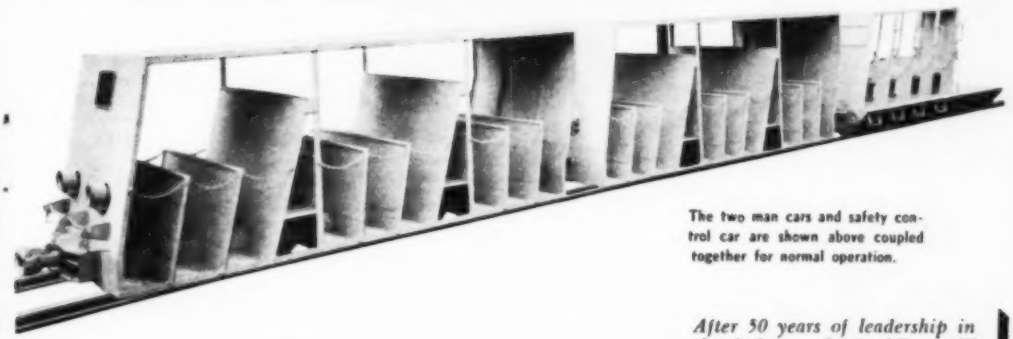
the New Sanford-Day Man Cars
Car Built for Peabody Coal Co.



This is the Sanford-Day Man Car built for Peabody Coal Co. It is 19 feet long by 7 feet wide by 6 feet 9 inches high. Car has safety chains, sealbeam headlights, safety glass window and silent rubber cushion type wheels. Passenger capacity 36 to 45 men.



This Sanford-Day Safety Control Car is 18 feet long by 7 feet wide by 6 feet high. Car has safety chains, sealbeam headlights, safety glass window, three pair of General Electric Shoe Brakes, automatically governor controlled and/or push button controlled, and silent rubber cushion type wheels. Passenger capacity four maintenance men. Supply capacity 75 square feet deck space.



The two man cars and safety control car are shown above coupled together for normal operation.

After 50 years of leadership in the industry, Sanford-Day still devotes its entire capacity to the production of mine cars. Most improvements in mine cars originate with this company.

KNOXVILLE, TENN.

- **REBUILDING**
- **MANUFACTURE**
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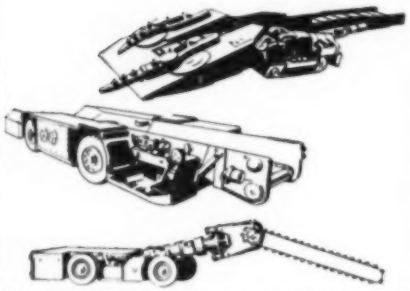
Service

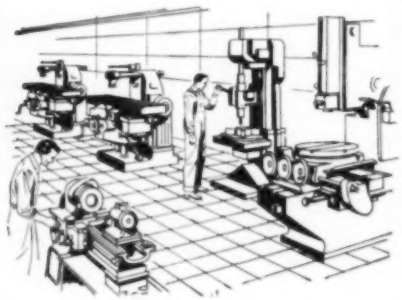
National Mine Service Company



NATIONAL MINE SERVICE

REBUILDING

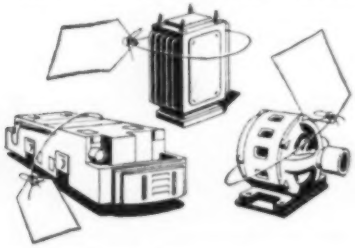
The largest, most complete, most finished rebuilding operations in the service field are maintained by National Mine. Shuttle cars, loaders, cutting machines, locomotives, motors, pumps, generator sets—anything and everything in mining equipment is rebuilt to factory standard. One whole Division (Ashland) is devoted to rebuilding JOY equipment.



NATIONAL MINE SERVICE

MANUFACTURE

The range of National Mine equipment manufacture spreads from the National Diesel Mine Locomotive—first Diesel to be approved by the U. S. Bureau of Mines for underground haulage—through electric locomotives, controllers, locomotive headlights, cable reels, cable guides, and other related products, to replacement parts for many types of mining equipment. Design, materials and workmanship are of highest quality, always.



NATIONAL MINE SERVICE

EQUIPMENT RESALE

Savings of time and money are gained when you use National Mine's equipment resale service to meet your urgent needs for standard or supplementary mine equipment. Sold repaired, rebuilt to your specifications, or "as is", you can be sure of sound value and exact representation. Write for our bi-monthly Stock Reports—check your N.M.S. man!

TO THE MINING INDUSTRY

FAST-VERSATILE-DEPENDABLE

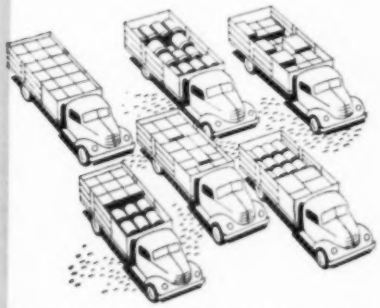
The consistent growth of this company—marked most recently by the addition of our large new Ashland Division—is based upon our regularly-demonstrated ability to deliver *better service*, over a wider range, to a great and increasing number of customers in the major coal-producing areas. The "National Mine" reputation for promptness, resourcefulness and fair dealing in every transaction has been well-earned and is zealously guarded.

Check your needs: for replacement parts, mine supplies, mine locomotives and components, complete rebuilding and repairing, resale equipment opportunities . . . any of the thousand items and services required by routine mine operations or special circumstances. *We'll deliver!*

NATIONAL MINE SERVICE

DISTRIBUTION

Well-stocked, strategically located warehouses make repair and replacement parts quickly available for mining equipment of all types. At your call are WHEAT Electric Cap Lamps and Charging Equipment . . . KOEHLER Flame Safety Lamps . . . HAYDEN Belt Fastening Equipment . . . wire and cable . . . Neo-Clad Maintenance Coatings . . . conveyor belting . . . comprehensive stocks of electrical, welding and maintenance supplies . . . "off-the-shelf" direct to you.



NATIONAL MINE SERVICE

DELIVERY

National Mine's fleet of pick-up and delivery trucks covers the major coal fields on regular schedules—extending the services of our seven divisions to your door. Our facilities include special emergency delivery whenever required. You can depend on National Mine Service!

Let us send you our descriptive "At Your Service" brochure, detailing the facilities of our organization—useful information for you to have!

National Mine Service Company

AT YOUR SERVICE

ASHLAND DIVISION
Ashland, Kentucky

ALL-STATE DIVISION
Logan, W. Va.

WHITEMAN DIVISION
Indiana and Altoona, Pa.

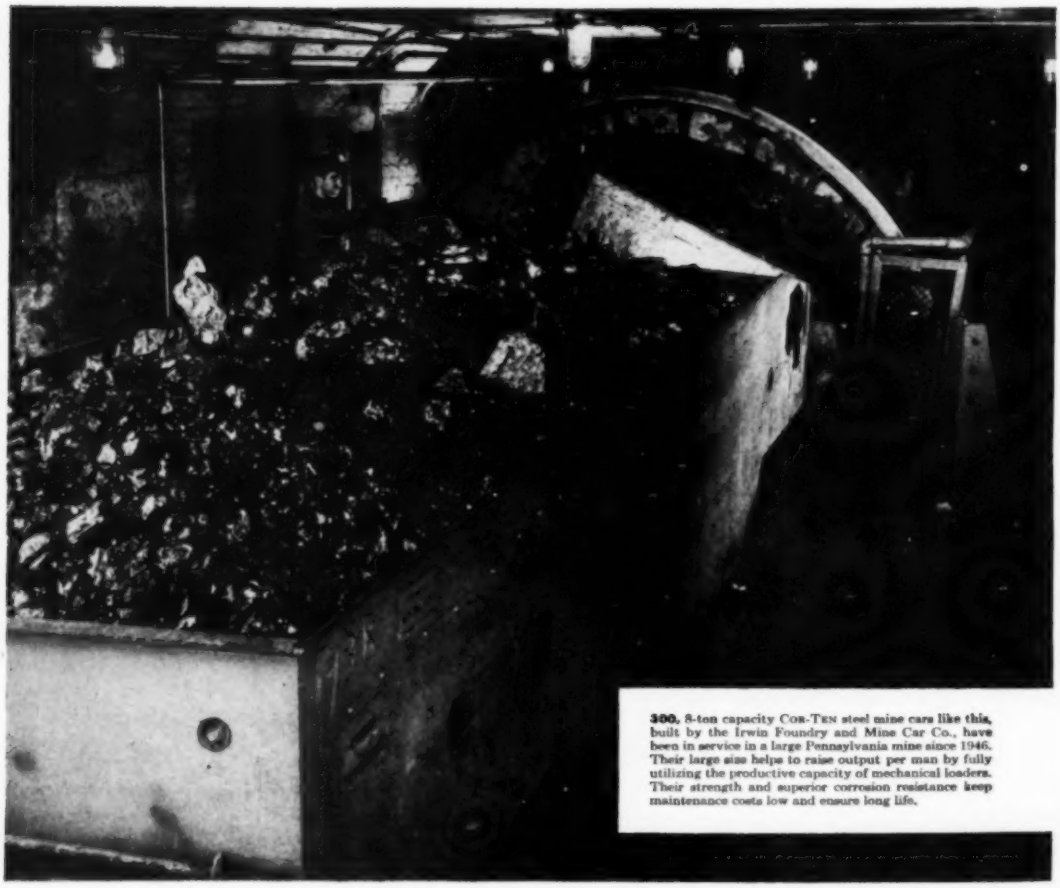
BEMECO DIVISION
Beckley, W. Va.

KY.-VA. DIVISION
Jenkins, Ky.

WESTERN KY. DIVISION
Madisonville, Ky.

ANTHRACITE DIVISION, Forty Fort, Pa.

29,725 mine cars have been built of U·S·S COR-TEN STEEL*



300, 8-ton capacity COR-TEN steel mine cars like this, built by the Irwin Foundry and Mine Car Co., have been in service in a large Pennsylvania mine since 1946. Their large size helps to raise output per man by fully utilizing the productive capacity of mechanical loaders. Their strength and superior corrosion resistance keep maintenance costs low and ensure long life.

THIS IS ONE of 575 mine cars built by the C. S. Card Iron Works utilizing U·S·S Cor-Ten steel. Capacity is 140 cubic feet. Weight was reduced 600 pounds over a car of similar capacity built of plain steel.

...and here's why!

Cars built of U·S·S Cor-Ten High Strength steel will out-last and out-perform cars built of plain steel. They cost less to operate. They require less maintenance. They are more dependable. The records of 29,725 cars built of Cor-Ten steel prove this beyond any question.

These facts are important to you. For in today's mines, the ability of equipment to stay on the job spells the difference between profit and loss. Mine cars must be dependable and hard-working. They must be big enough to move large quantities of coal. They must be rugged enough to take the day-in and day-out pounding. Yet, they must be light enough to be moved quickly and easily.

A car made of U·S·S Cor-Ten High Strength steel will meet all of these requirements. Cor-Ten steel construction will give you a stronger, tougher car . . . a car that has a greater resistance to deterioration, hard knocks and severe service. Yet, the weight of the car need be no more than a similar car made of plain carbon steel. Cor-Ten steel can also be used in lighter gages to increase car capacity without increasing weight, or to build a car of the same capacity that weighs less.

These advantages are possible because U·S·S Cor-Ten steel has a yield point of 50,000 psi—1½ times that of plain steel . . . because it has greater ability to resist shock, abrasion and wear . . . because its fatigue strength is 60% higher . . . because it has 4 to 6 times the resistance to atmospheric corrosion.

To get the complete story on U·S·S Cor-Ten High Strength steel . . . to learn about all the important money-saving advantages it offers you . . . contact our nearest office.

*Cor-Ten is the registered trade-mark of United States Steel Company for one of its high-strength, low-alloy steels.

UNITED STATES STEEL COMPANY, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S COR-TEN High Strength STEEL

USS

2-1911

UNITED STATES STEEL

Steady power for a hungry bucket

That 5-yd. bucket, swinging high from a Manitowoc Speedcrane's 120-ft. boom, needs plenty of power to keep it biting. Stripping overburden in a Pennsylvania anthracite field, it hacks through 10 ft. of dirt and 60 to 70 ft. of shot-hard rock to get at a vein of coal 8 to 10 ft. thick. And it draws its power from a "Caterpillar" Diesel D386 Engine, on the job 16 hours a day, 12 months a year.

"We're extremely pleased with the operation of this engine," says J. Futch & Son of Pittston, Penna., an outfit that knows the importance of dependable dragline power. "Cat" Diesel Engines have dependability and long life built right in them. One example: all crankshaft bearing surfaces are "Hi-Electro" hardened and Superfinished for extra years of steady performance. Available in 12 sizes up to 500 HP, these Diesels are honestly rated. Remember, an engine that has to strain to reach its horsepower rating is asking for expensive breakdowns, frequent overhauls and higher maintenance costs.

Your nearby "Caterpillar" Dealer can give you the full story on the dependable power that's packed into every "Cat" Diesel Engine. Why not see him soon?

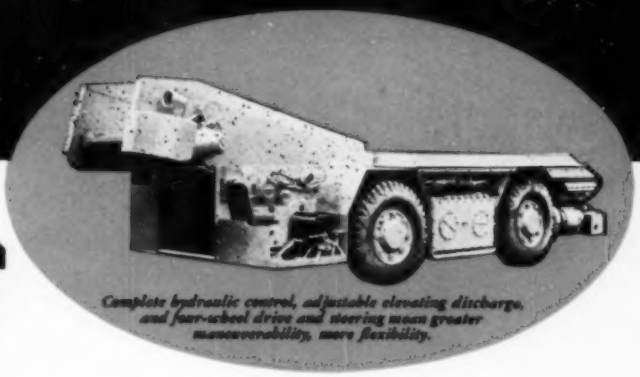
CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

The 10-SC, here being loaded by a JOY Continuous Miner, has the capacity, power and speed needed for real high-production work.



Complete hydraulic control, adjustable elevating discharge, and four-wheel drive and steering mean greater maneuverability, more flexibility.

JOY

10-SC SHUTTLE CAR

A *RUGGED, HEAVY-DUTY* MACHINE—

field-proved for fast, dependable, low-cost transfer in high-production mining!

W&D CL 2920

Write for Bulletin, or

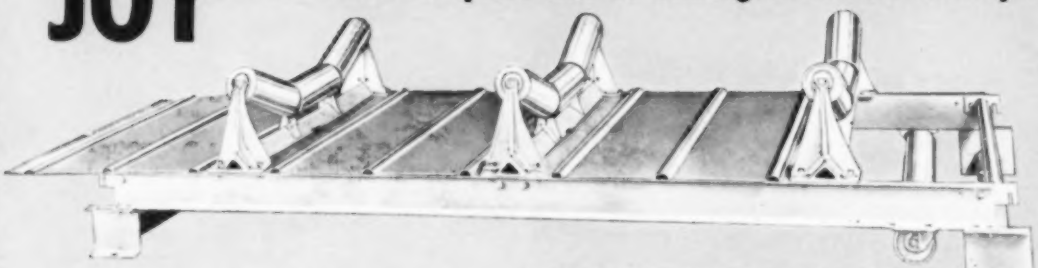
Consult a Joy Engineer

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

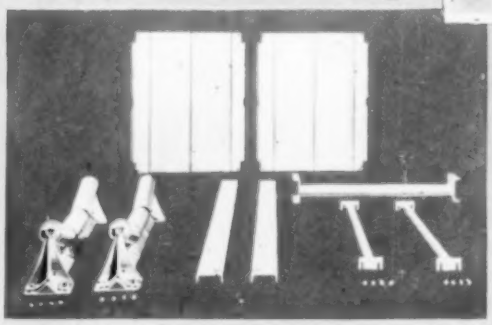
IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

JOY... the most complete line of Underground Belt Conveyors



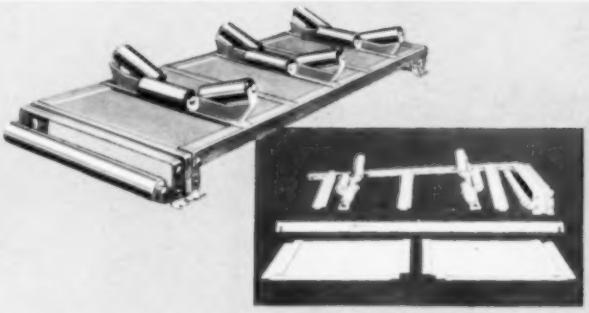
ABOVE: 12′ Intermediate Conveyor Section for very heavy duty. Unit is knockdown type, for use with 48″ belt. For additional strength, cover sheets are corrugated—stringers are of 6″ channel steel. Cross pipe spacers, which drop into place without bolts, rigidly brace the section and hold it in alignment. The cover sheets *lap under* the troughing idler base angles to prevent leakage. Belt idlers have grease-type bearings as standard equipment, but can be furnished with sealed, precision bearings.

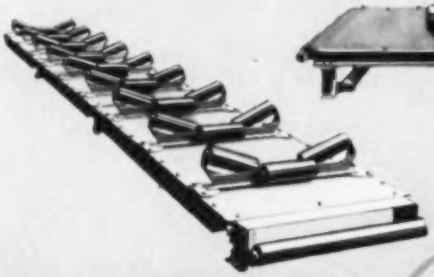
RIGHT: 8′ Intermediate Conveyor Section, similar in design to above, for use with 42″ wide belt. This unit can be knocked down into easily handled pieces, as shown, for easy transportation.

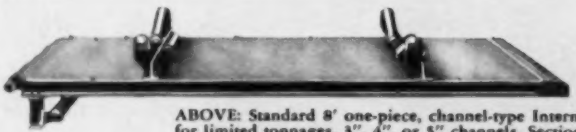


RIGHT: 9′ Intermediate Conveyor Section of knockdown design. Can be furnished for 26-30-36-or-42″ belts. Belt idlers have sealed, precision bearings. Cradle is heavy, die-formed, ribbed pressed steel. This is a heavy duty unit of minimum height—15¾″ to 18¾″—for use in thin-seam mining.

RIGHT, BELOW: Similar style in 8′ length. Note that the only bolts used in joining are those which anchor the troughing idler brackets to the side rails.







ABOVE: Standard 8′ one-piece, channel-type Intermediate Section for limited tonnages. 3″, 4″, or 5″ channels. Sections are self-contained with cross pipe-spacers welded between channels. Pivotal section connection. Section connection made without bolts or loose parts of any kind.

LEFT: Three 9′ sections joined together. Each is of one-piece, welded construction. Side rails are 5″ steel channels. Ribbed pressed steel cradle. Pivotal section connections. For 30″, 36″ (illustrated), or 42″ belts.

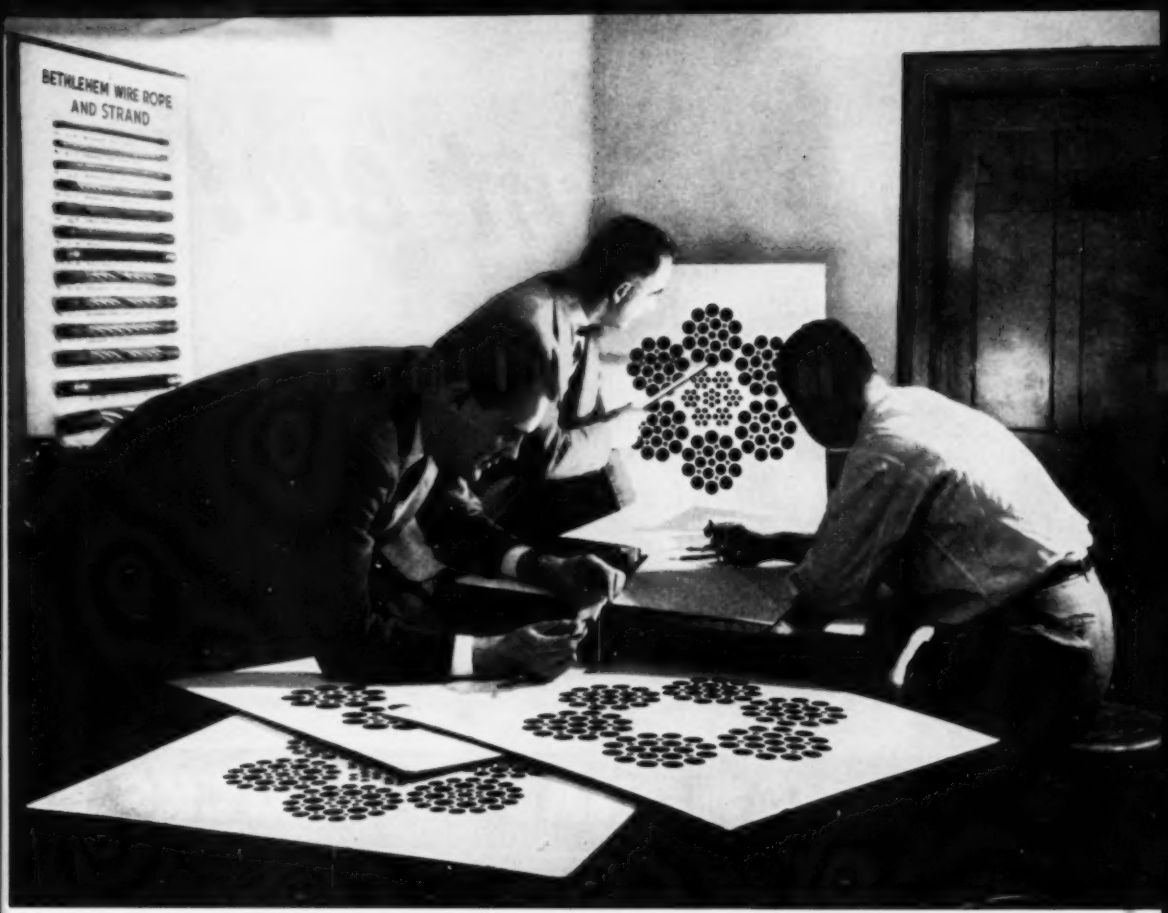
Consult a Joy Engineer

WAS CL 4340

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



Much of the durability of Bethlehem wire rope can be traced back to the engineer and the drawing-board.

So that your Wire Rope will serve you well

These engineers are engaged in a typical discussion of the product they live with—Bethlehem wire rope. They know the tremendous importance of good design, good engineering . . . and they will spend many hours, sometimes days, over a seemingly small point that they feel will improve the quality of Bethlehem rope.

The making of wire rope is more than a matter of drawing wire and laying wires and strands into intricate patterns. Wire rope starts in the minds of engineers, and at Bethlehem these minds are busy ones.

When you rig with Bethlehem rope, you can be sure that the rope has been well designed, well engineered . . . and that every subsequent step has received the same degree of care.

This care pays off on the job, where Bethlehem rope will serve you well. You can depend upon every foot, every inch of it, no matter how tough the going.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM

Just count 'em!

Count the number of Internationals you see next time you're on the highway.

Why? Because you'll learn this very simple truth: professionals in the hauling business use more heavy-duty Internationals than any other make of truck. They're engineered to do the job.

The reason for the professionals' preference is that Internationals give them lower operating and maintenance costs, longer truck life. Why not see your International Truck Dealer or Branch and let him show you how he can give you these truck values on your job? Do it soon.

INTERNATIONAL HARVESTER COMPANY · CHICAGO

Only International's give you:

- All-truck engines—exclusively for truck work—built in the world's largest truck engine plant.
- The "roomiest, most comfortable cab on the road"—the Comfo-Vision Cab designed by drivers for drivers.
- Super-steering system—more positive control, easier handling and 37° turning angle.
- Traditional truck toughness that has kept International first in heavy-duty truck sales for 20 straight years.
- Extra heavy-duty specialization—includes engines, transmissions, axles, springs, frames, etc. . . . engineered for your job to save you money.
- America's largest exclusive truck service organization.

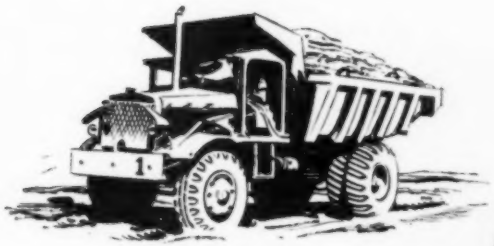
International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

INTERNATIONAL TRUCKS

"Standard of the Highway"

International LF-210 series offers GVW ratings from 37,000 to 45,000 lbs., wheelbases 157 to 175 inches.

MUSCLE MAN
for tire-killing jobs



THIS burly giant pulls through rough going that other tires find hard to take. Massive lug-bars armor its underbody and sidewalls—shrug off stones, stumps, snags and potholes. Extra thick, self-cleaning treads shield its extra thick plies—give you better traction, *full pull*, forward or reverse. A sturdy standby is this super-tough Goodyear—the Hard Rock Lug. Wherever the going is really rugged, it can save you time and money—perhaps the job itself!

HARD ROCK LUG
Super-tough champ in all types of tire-killing work.

HARD ROCK RIB
Companion tire for front wheels in all tire-killing service. Easier steering, smooth rolling, same cord body, same shoulder and sidewall as the Hard Rock Lug.

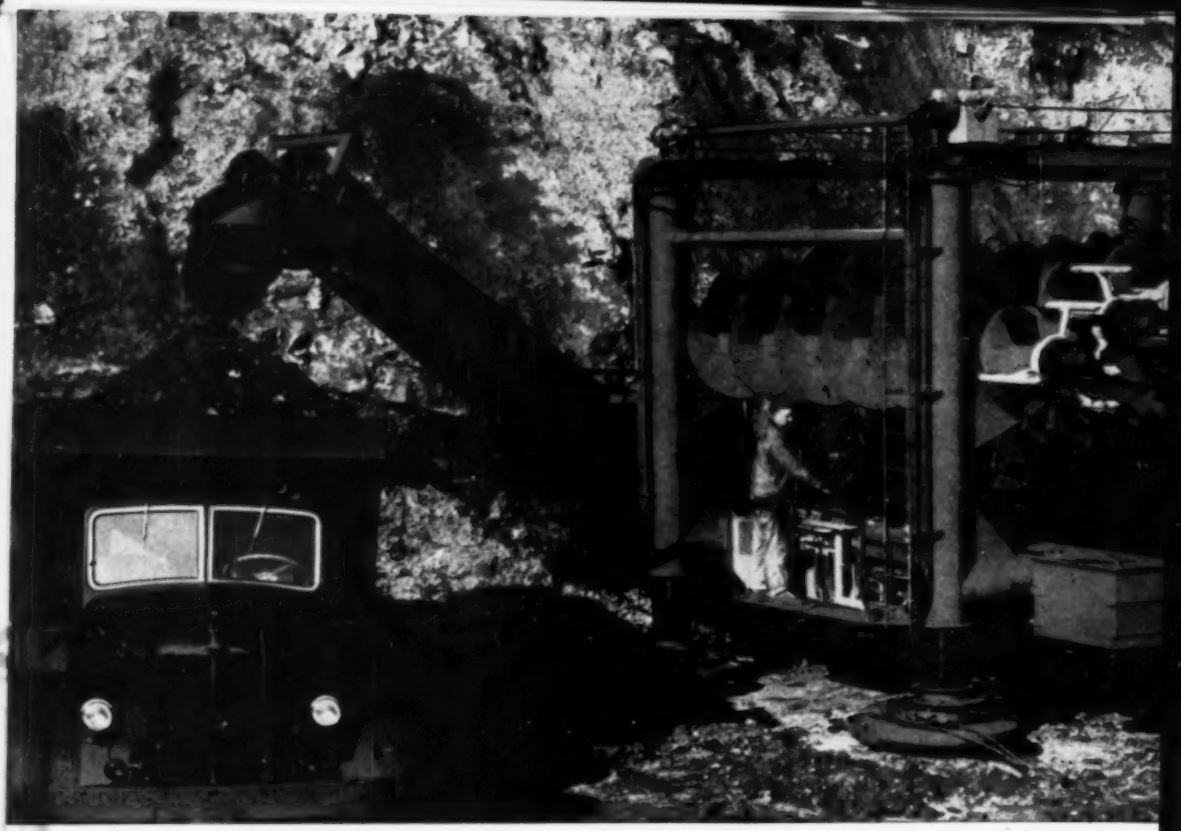
ROAD LUG
This high-stamina, dual-purpose tire is best for trucks that operate both OFF and ON the road. Tough construction and special tread design provide super-traction off the road—long, smooth mileage on the road.

FOR EVERY JOB, THERE'S A COST-CUTTING GOODYEAR TIRE!

Road Lug—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND



COMPTON AUGER

Improves product and cuts cost of

STRIP MINE OPERATIONS

The Compton Auger introduces an entirely new and unique method of recovering high wall coal at phenomenally low costs.

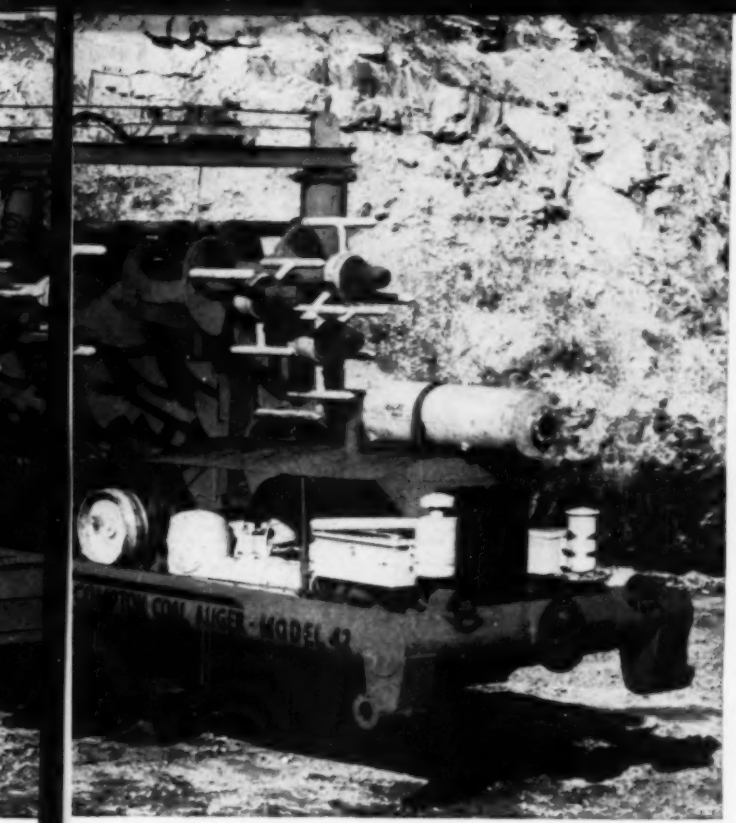
Used in conjunction with your present strip mining equipment you can blend auger mined coal with your regular production and improve the overall quality substantially.

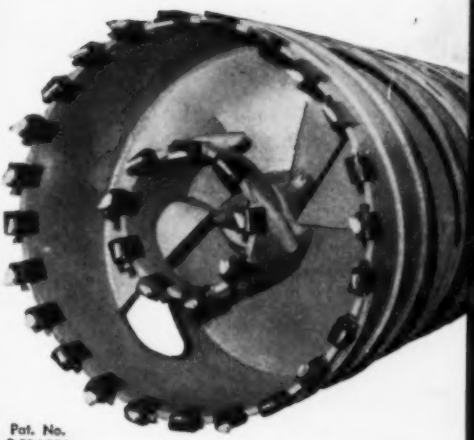
In mines where these machines have been in operation for the past two or three years, the Auger has paid for itself many times. In fact, under normal production conditions it should pay off the investment in six months or less.

From the productive standpoint, the Model 42 shown here has been drilling 42 inch holes to a 189 foot depth and producing up to 500 tons per shift in the Pittsburgh seam. Another example—Nine Compton augers in use by five companies in three states have a total potential capacity of 1,800,000 tons per year based on 200 days of two shift work.

The Model 42 is 42 feet in length—weighs approximately 33 tons—carries nine 21 foot auger sections—requires only a 45 foot minimum pit width—is powered with 225 H.P. Diesel engine—has hydraulic jacks in each of the four vertical frame members which have a lift of 66 inches and permit drilling of overlapping holes—can be equipped with augers from 48 inch to 30 inch diameter.

The Compton Model 56 Auger is 56 feet in length—weighs approximately 50 tons—carries six 34 foot auger sections—requires a minimum pit width of 60 feet—also has a hydraulic lift of 66 inches and permits drilling of single or overlapping holes—is powered by a 300 H.P. Diesel engine—can be furnished with augers from 52 inch to 30 inch diameter—and provides a total drilling depth of 204 feet.





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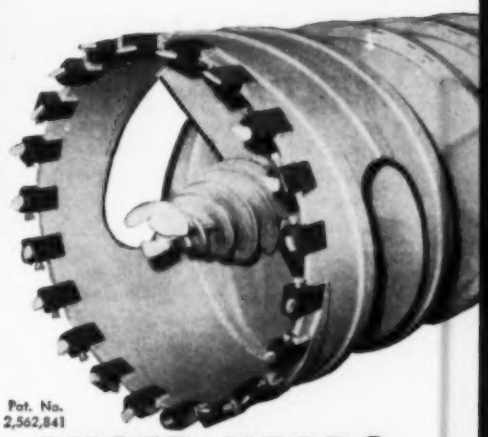
2,594,256



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2,562,841

MINING...

COMPTON *Non-Clogging* AUGER HEADS

(PATENTED)

The unique cutting heads shown here were designed—developed and built by a coal operating company and their construction adheres closely to long accepted and proved practices of cutting coal. These new cutter heads have two types of core breakers which are interchangeable to meet the requirements of the various seam structures and to produce more and larger lump coal.

The new type heads, capable of cutting coal at high speeds without clogging, assure a continuous flow of coal from head to truck during entire hole cutting operation. Maintaining a constant peripheral speed for all diameters makes it possible to get large tonnages even with the smaller diameter augers.

COMPTON, Inc. ORIGINATORS OF COMPTON LUMP RECOVERY HEAD

Box 1946—Phone 4-6384 **CLARKSBURG, W. VA.**

★ DECO COAL FINES FLOTATION

Construction work at the Locust Summit Plant of The Philadelphia and Reading Coal and Iron Company will double the coarse coal flotation capacity. The Philadelphia and Reading Coal and Iron Company picked Denver "Sub-A" (Lasseter Type) Flotation Machines for their first coal flotation operation, in full, three-shift production since February, 1952. Again, Denver "Sub-A" (Lasseter Type) Flotation Machines will be used for the new addition.

The Philadelphia and Reading Coal and Iron Co. Will Double Flotation Capacity with Denver Machines

The Philadelphia and Reading Coal and Iron Company will have the largest coarse coal flotation capacity in the world upon completion of present construction work at the Locust Summit Plant, near Ashland, Pa. The addition of 24 new Denver "Sub-A" (Lasseter Type) Flotation Machines will more than double the plant's present capacity of a-ton-a-minute.

Twenty-four Denver "Sub-A" (Lasseter Type) Flotation Machines are already operating three shifts a day. One of the major factors in the success of this operation has been the economy and high recovery from these Denver Flotation Machines.

The first Lasseter Type Denver "Sub-A" Flotation Machines were installed in the Locust Summit Plant in 1950. Commercial production was reached in May, 1950; and between that time and February, 1951, 1,643 railroad cars of coal were produced in 112 single shifts and 69 double shifts.

LABORATORY TESTS DETERMINE PROFITS

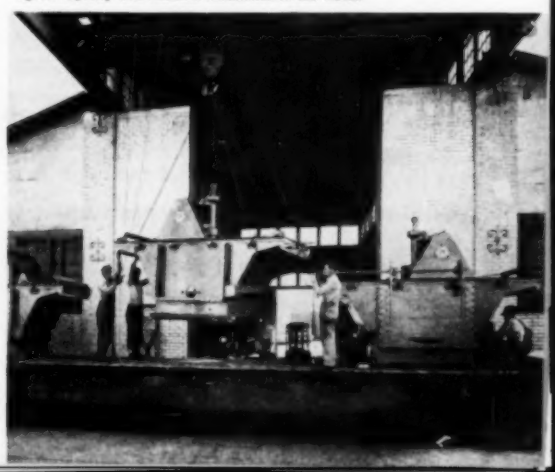
After laboratory and pilot plant testing, Denver "Sub-A" (Lasseter Type) Flotation Machines were selected. These machines discharge an appreciable quantity of +28 mesh material with sizes as large as 8 mesh in concentrate, or product.

10 MILLION TON SURFACE RESERVE

Concentrate is delivered by gravity to a belt conveyor which takes the concentrate to a loading chute to railroad cars. Moisture in the product, as loaded, is

These Denver "Sub-A" (Lasseter Type) Flotation Machines, now operating in the Locust Summit Plant, discharge minus 10 mesh floated coal—ash of 24-30% in the feed is reduced to 11.5-13.5% ash in the concentrates.

Denver Equipment Company men load part of the shipment of new Denver "Sub-A" (Lasseter Type) Flotation Machines for The Philadelphia and Reading Coal and Iron Company. The new expansion program will make this the highest capacity coal flotation installation in the world.



reduced by siphoning free water and by natural gravity drainage to an end result of 12 to 15 percent.

When the adjacent Locust Summit Central Breaker is operating, feed for the flotation plant is obtained from breaker discharge. When the breaker is not operating, feed for the flotation plant is obtained from slush deposits which are estimated to contain more than 10 million tons of material.

A-TON-A-MINUTE RECOVERED

During the first year of intermittent operation, over 100,000 tons of marketable, low ash coal were produced. Present production is between 1,100 and 1,200 tons per triple shift.

OPERATING RESULTS

Typical operating results in the primary flotation circuit are as follows:

	Feed	Coal	Refuse
GPM	970	506	620
Percent Solids	34.17	50.14	10.88
T.P.H. (dry weight)	83	65.1	17.9
Percent Ash	24-30	11.5-13.5	59-65

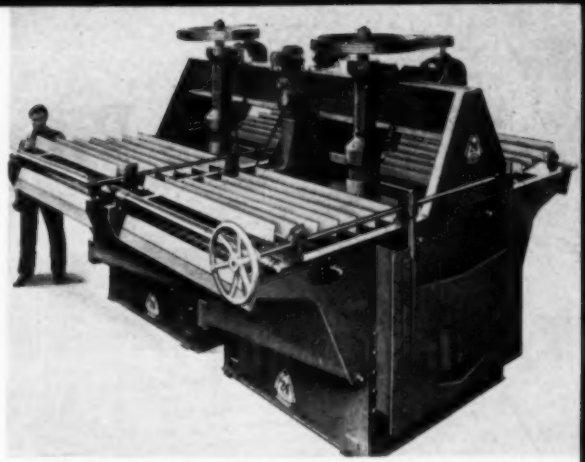
Find out how you can increase your profits with Denver "Sub-A" Flotation for your coal fines – end stream polution and big wastes. Write for free bulletin which gives complete details, or phone DECO for immediate engineering recommendations. Get a low ash, high market value product with Denver "Sub-A" (Lasseter Type) Flotation Machines – complete equipment for your coal flotation plant – one responsibility, one source.

Our 25th year of Flotation Engineering

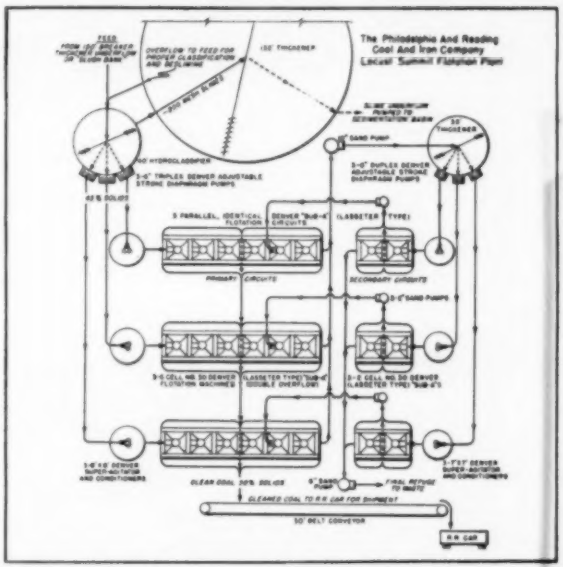
DENVER EQUIPMENT CO.

1400 17TH STREET

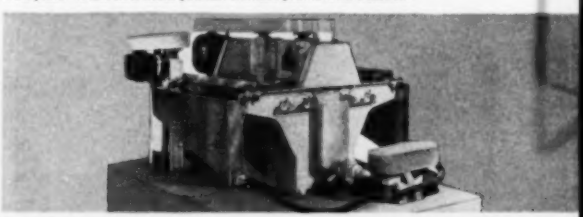
DENVER, COLORADO



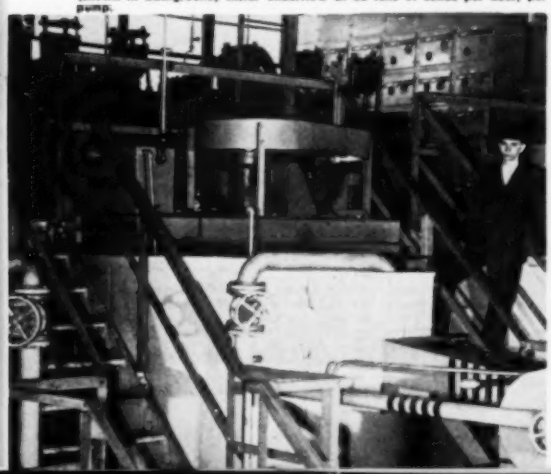
With the Denver "Sub-A" (Lasseter Type) Flotation Machines, slotted, stainless steel rakes discharge a heavy matte of clean coal, which is carried directly to railroad cars. On initial operation, 112 single shifts and 69 double shifts at this plant produced 1,643 carloads of coal formerly wasted in slush banks.



Laboratory Denver "Sub-A" (Lasseter Type) Flotation Machine cells are available for on-the-job pilot testing. Ask DECO about testing work in your own plant—to see how much you can increase profits with flotation.



8' x 8' Denver Super-Agitators and Conditioners thoroughly disperse the kerosene promoter throughout the pulp before feeding to the primary flotation circuit. Three Triplex 6" Denver Adjustable Stroke Diaphragm Pumps (shown in background) meter underflow at 30 tons of solids per hour, per pump.



DENVER EQUIPMENT CO
1400 17th Street, Denver 17 Colorado

Please send me a Deco Engineering Bulletin on the Locust Summit Plant, and Deco Engineering Bulletins on other coal flotation plants.

NAME_____

COMPANY_____ TITLE_____

ADDRESS_____

CITY AND STATE_____

The Proper Rope Plus

TO COMBAT FATIGUE Tiger Brand 6x37—Type S Excellay Preformed. This rope is listed as "Special Flexible Hoisting Rope" and is also known as "Crane Rope." It is the most flexible of standard constructions which permits its use with small sheaves and drums. Its reserve strength is highest of the standard constructions.

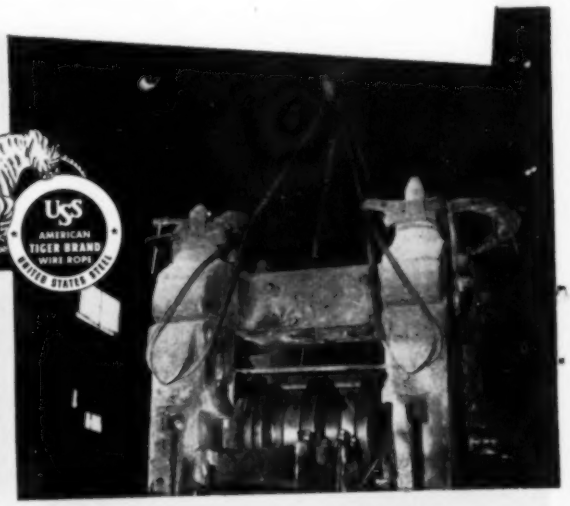
FOR RESISTING CRUSHING, the introduction of a steel core instead of regular fiber core in the various types of ropes, minimizes the harmful effect of crushing and maintains the intended position of all strands in the rope.

The section of American Tiger Brand 6x30 Type G Excellay Flattened Strand Lang Lay with I.W.R.C. as shown, combines the features of increased strength because of the large metallic area, greater distribution of wear on the outside wires, resistance to crushing of the core and flexibility because of the type of rope itself.

TO COMBAT ABRASION American Tiger Brand 6x19 Seale Patent Excellay Monitor Preformed Wire Rope offers greater resistance than regular hoisting ropes because of the large, uniform wire diameters of the outside wires in each strand. Lang Lay construction also increases the resistance by a better distribution of the wear over a greater length of the outer wires.

THE "OLD WORKHORSE" Tiger Brand 6x19 Type N Excellay Preformed Standard Hoisting Rope is more widely used in a greater variety of applications than any other type. It has a superior combination of qualities—good resistance to abrasion and fatigue, high strength and long life. With wire core it has 7½ percent greater strength than with fiber core.

More than a million tons of oyster shells have been converted into chemicals at this plant. The owners have found that Tiger Brand Wire Rope stands up best under these severe abrasive conditions, cutting rope costs, reducing down time and keeping equipment at top capacity.



The slings the thing, especially when you are handling heavy lifts such as the machinery shown here. And Tiger Wire Rope Slings are designed to handle all jobs promptly, safely and economically. They are made of the toughest, strongest wire rope manufactured, and come in many types. Write for our book, "American Tiger Wire Rope Slings."

Proper Maintenance

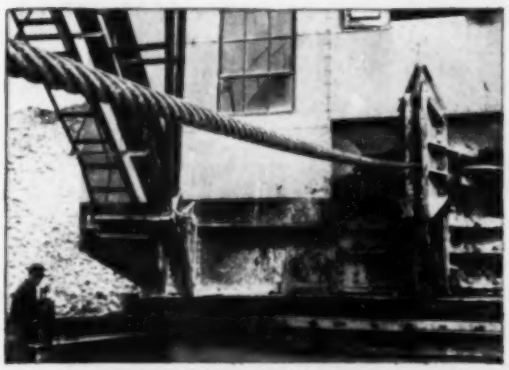
Equals Longer Rope Life Lower Rope Costs

● Many prominent users of wire rope have found they can reduce wire rope costs as much as 50% by using a wire rope designed for the job. They get better rope service at lower rope cost by following this simple, job-tested system, with the help of the Tiger Brand Wire Rope Specialist.

Let this qualified expert make *sure* that you select, for each job, a wire rope that is strong enough to carry the load with an ample margin of safety . . . able to stand incessant flexing and sharp bending without failure of wires due to fatigue . . . built to take the most severe abrasion and crushing. Then make sure that every foot of wire rope you own is inspected, cleaned and lubricated *regularly*.

Engineers and contractors who follow this procedure tell us that they are getting twice—sometimes three times — the life they expected from Tiger Brand Wire Rope, plus greater safety for crews and equipment and freedom from rope-caused work stoppages, all of which means important money savings.

When you are in the market for wire rope, make full use of the engineering knowledge of an expert who has made a life-work of analyzing and solving wire rope problems. Just drop us a line and your Tiger Brand Wire Rope Specialist will be glad to consult with you. Meanwhile, why not send in the convenient coupon for a copy of our latest book?



This new Tiger Brand Drag Line Rope was designed especially to resist the extremely severe operating conditions encountered in this class of service. On one job where ropes lasted an average of 600 hours, this Tiger Brand Drag Line Rope was still going strong after 1100 hours—believe it or not!

Send for This NEW BOOK

It contains specification data that will help you select the right rope for each application. In descriptive text, illustrations, diagrams and tables, it gives you complete information on types of rope, diameters, working loads and safety factors for all sorts of rope service.

American Steel & Wire
Rockefeller Building, Dept. J-11
Cleveland 13, Ohio
Please send me your new book,
"Specification Data, Tiger Brand Wire Rope."

Name.....

Company.....

Address.....

City.....Zone..State.....

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

BEHIND THE NAME

HOLMES

IS 80 YEARS OF "*SPECIALIZED*" MANUFACTURING OF

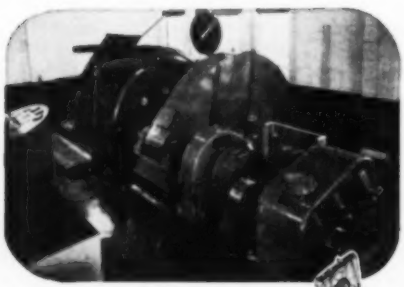
RELIABLE MINE EQUIPMENT

Baughman "Verti-Vane" Thermal Coal Dryer handles all sizes from 1¼" down. Reduces surface moisture to approx. 2%. 15 to 75 TPH capacity.

Increased mine production and efficiency—from the pit or shaft to the loading dock—are found today in hundreds of mines because of equipment pioneered by Holmes. Use this specialized experience to obtain the most advanced design, the best of materials and the latest methods of manufacture. Take advantage of this creative engineering and long-standing reputation for sturdy construction that assures efficient, dependable performance at a lower over-all cost. Call on a Holmes Mine Equipment Engineer for consultation in the planning and development of your requirements. There is no obligation.

ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

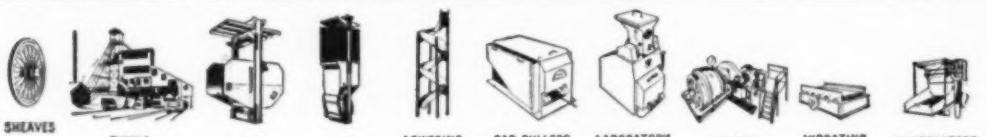
Dept. A-22



Holmes Advance Design Hoists feature the latest and most complete control equipment. Ask for complete information.

Ask for new Catalog Literature containing vital construction and installation information on The Baughman Verti-Vane dryer—Bulletin No. 101.

Peabody Coal Company's new mine No. 17 at Pana, Illinois, is equipped with Holmes Hoisting Equipment.



SHEAVES · TIPPLE EQUIPMENT · CAGES · SKIPS · LOWERING SPIRALS · CAR PULLERS AND RETARDERS · LABORATORY CRUSHERS · HOISTS · VIBRATING SCREENS · DUSTOLATORS

HERE'S YOUR ANSWER TO MILDEW—

No. 1 enemy of conveyor belts

GOODYEAR INDUSTRIAL RUBBER PRODUCTS
-Specified COAL-FLO CONVEYOR BELTS
for UNDERGROUND SERVICE IN COAL MINES
(Mildew-Inhibited Throughout)
A
B
C
D
A Tough, thick cover of acid-resisting rubber
B Sturdy, horseshoe-shaped breaker protects ply edges from fraying and wicking moisture
C Multi-plies of strong, sturdy fabric
D Rubber skim-coat between plies increases flex life

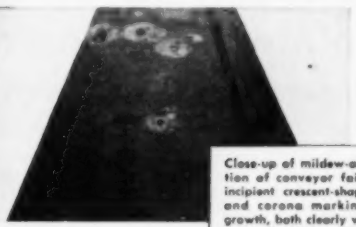
WHY does a conveyor belt develop soft, circular "mushy spots" and lose fastener holding strength? It's "cancer"—mildew-caused rot of the tension member of the belt, as the G.T.M.—Goodyear Technical Man—proved *conclusively* three decades ago.

The G.T.M. can show you that mildew—aided by darkness, intermittent belt use, dampness, lack of ventilation and uniform moderate temperatures—is a major cause of premature conveyor belt failure. *But not with Goodyear* belts!

Completely Mildew-Inhibited

An exclusive treatment—developed by the G.T.M. and proved by almost 30 years' service in thousands of belt installations—effectively inhibits Goodyear Conveyor Belts against attack from every type of mildew. It is one more reason why more tons, the world over, are carried on Goodyear Conveyor Belts than on any other kind—and why Goodyear belts give longer, more trouble-free, lower-cost service.

It will pay you to ask the G.T.M. for the full mildew story. You can get in touch with him through your nearest Goodyear Distributor, or by writing Goodyear, Akron 16, Ohio.



Close-up of mildew-affected section of conveyor failure. Note incipient crescent-shaped breaks and corona marking mildew growth, both clearly visible after removal of belt cover.

LOOK FOR YOUR NEAREST GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR *in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods." He handles Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls built to the world's highest standard of quality.*

GOODYEAR

THE GREATEST NAME IN RUBBER

Goodyear—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

No body-hoist

GRAVITY DUMP cuts maintenance costs... speeds haul cycles

Koehring Dumptors have no slow-working body hoists. Trip the release lever and gravity dumps the 6-yard load in one second. It's as simple as that! No complicated mechanical hoists to slow up haul cycles . . . no expensive replacement parts, costly hoist maintenance or down time to eat into your profits. And gravity dump is instantaneous and trouble-free in all temperature extremes . . . never wears out.

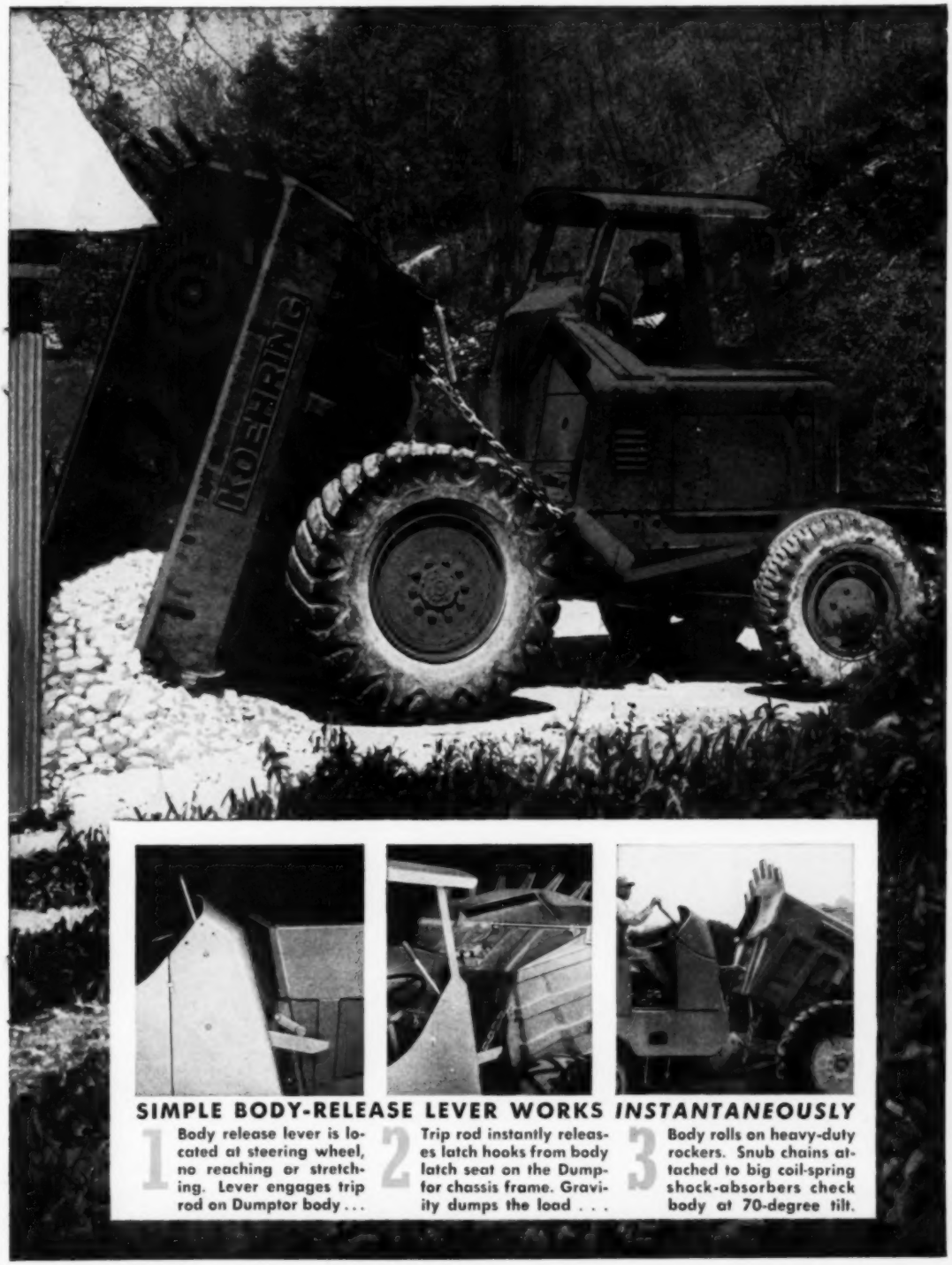
No costly spring maintenance is another money-saving advantage you get with Koehring Dumptors. There is just one big, double-coil chassis spring on steering axle . . . none on driving axle. Extra-big, shock-absorbing drive tires eliminate need for more. You save spring maintenance time and replacement costs.

Check your body hoist and spring maintenance costs for a year . . . see how much you'll save by using Dumptors. What's more, Dumptor's no-turn shuttle haul and constant-mesh transmission for 3-speed travel forward and reverse, increases production . . . and your profits. See your Koehring distributor now for all the facts . . . or send today for informative 28-page Dumptor catalog.

KOEHRING COMPANY, Milwaukee 16, Wis.
(Subsidiaries:) JOHNSON • PARSONS • KWIK-MIX

KOEHRING DUMPTOR®

CRANES UP TO 79½ TONS LIFT CAPACITIES . . . EXCAVATORS UP TO 2½ YARDS



SIMPLE BODY-RELEASE LEVER WORKS *INSTANTANEOUSLY*

1 Body release lever is located at steering wheel, no reaching or stretching. Lever engages trip rod on Dumptor body . . .

2 Trip rod instantly releases latch hooks from body latch seat on the Dumptor chassis frame. Gravity dumps the load . . .

3 Body rolls on heavy-duty rockers. Snub chains attached to big coil-spring shock-absorbers check body at 70-degree tilt.

Again Outstanding DESIGN for New Speed and Economy in Drilling

Parmanco

MODEL 51 • SELF-PROPELLED • HYDRAULIC

COAL AND CLAY DRILL

This Model 51, one-man operated drill, adds another unit to the top performing PARMANCO line of drilling machines.

An example of its great value is seen in its ability to drill 2½-inch holes at a speed up to 7 feet per minute in No. 5 coal. It will also handle 4¼ - inch augers up to 25 feet in depth.

• Hydraulic Feed • Finger-Tip Controlled • Fluid Motor for Auger Rotation

4 Jacks and Power Winch optional at extra cost.

Above

New Automatic

CUTTINGS SHIELD

and

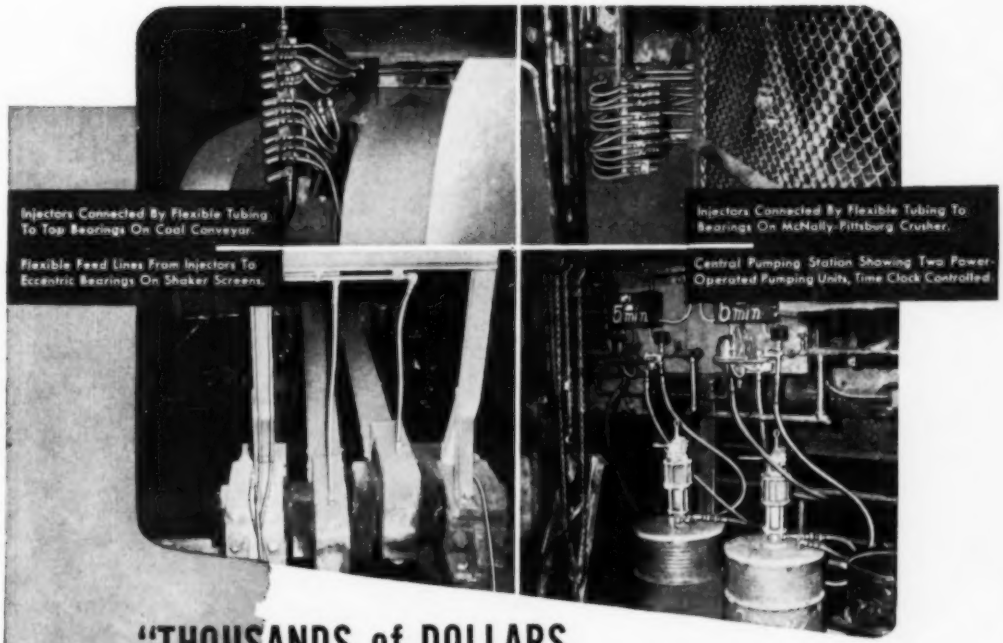
GUIDE

Model 51 is equipped with the newly perfected Automatic Drill-Cuttings Shield and Guide. Now blast holes are kept absolutely clean from cuttings. Note in picture how a dam is formed about the blast hole, excluding casual surface water.

Looking down on New Automatic Drill-Cuttings Shield and Guide located at the right of driver's seat.

Send for Complete Details

PARIS MANUFACTURING COMPANY • PARIS, ILLINOIS



Injectors Connected By Flexible Tubing To Top Bearings On Coal Conveyor.

Injectors Connected By Flexible Tubing To Bearings On McNally-Pittsburg Crusher.

Flexible Feed Lines From Injectors To Eccentric Bearings On Shaker Screens.

Central Pumping Station Showing Two Power-Operated Pumping Units, Time Clock Controlled

"THOUSANDS of DOLLARS in MANHOURS and DOWNTIME SAVED by *Lincoln* Centralized Lubrication System"

at WIERTON COAL COMPANY'S Isabella Mine, Isabella, Penn.

Approximately 500 bearings are lubricated automatically, by time clock control, in this typical preparation plant installation.

The operator reports *not one single bearing replacement or failure due to faulty lubrication* since the Lincoln System was installed four years ago. Lubricant consumption has been reduced 30 lbs. per day. Savings in manhours and machine downtime have been reduced by thousands of dollars.

In addition to the tremendous reduction in downtime for Lubrication, you can eliminate accident hazards associated with manual lubrication . . . increase bearing life up to 1500% . . . eliminate waste and contamination of lubricants.

Bulletin 680 describes many other advantages of LINCOLN Centralized Lubrication Systems for the mining industry. Write for your copy.

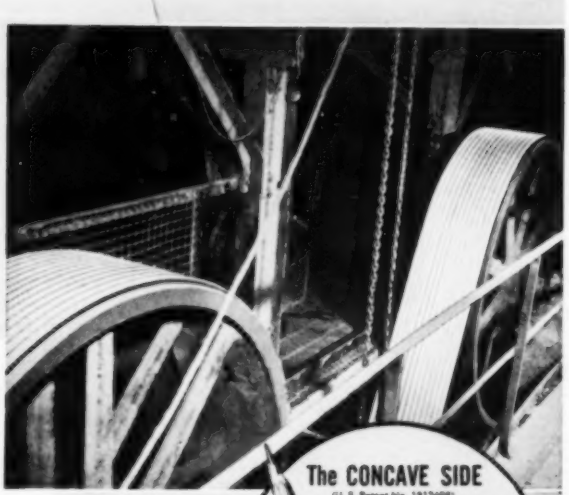
• • • PIONEER BUILDERS

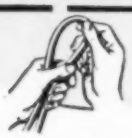
LINCOLN LUBRICATING EQUIPMENT • • •

See for Yourself WHY

Gates Vulco Ropes Wear Longer

These tube mills at the Missouri Portland Cement Co., Kansas City, Mo., were formerly driven by long flat belts. Belt dressing, used to control slipping, picked up dust and built up an irregular cake on the pulleys—causing terrific tension on the belts and shock loads on the bearings. The bearings burned out; belts snapped. Replaced in 1946 by the Gates Vulco Rope Drive shown, belt failures have been eliminated and the drive installation is much more compact.





Make this Simple Test

Take any V-belt that has *straight* sides. Bend that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. This belt, when bent, precisely fits its sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the full face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

When you buy V-belts, be sure to get the V-belt with the Concave Sides--the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

What Happens When a V-Belt Bends

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

Gates Vulco Rope with Concave Sides

The Concave Sides Fill Out to a Precise Fit in the Sheave-Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley — Uniform Wear — Longer Life!

CS-528-B

Gates VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

V-Belts — Hose
Molded Rubber Goods
for industry
World's Largest Maker of V-Belts

Here's the Big Difference!

TAPER-LOCK

–The Sheave that always runs true!

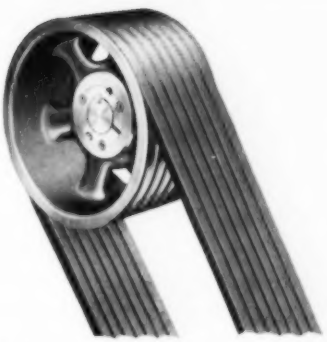
The Taper-Lock bushing seats evenly along the entire length of the hub. It is self-seating. There is no collar—no protruding part—no flange to prevent uniform compression.

With full contact, Taper-Lock sheaves run true. Made of finest grade of close-grained semi-steel, cast in the Dodge foundry. Precision grooves have identical pitch diameters so that every belt can pull its share of the load.

Sheave and bushing mount as a unit—easy to align on the shaft. Grips the shaft like a shrunk-on fit. Flush hub means safety.

THERE IS ONLY ONE TAPER-LOCK (a patented product of Dodge). Available from distributors' stocks in a complete range of sizes in A-B combination, B, C and D grooves. Also ask your distributors for Dodge Sealed-Life V-Belts. WRITE for complete data.

DODGE MANUFACTURING CORPORATION, 3000 Union St., Mishawaka, Indiana



DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER

your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book.

NOW is the time to

OFFSET RISING COSTS WITH HIGHER RECOVERY

by Heavy-Media Separation

You know how much more it now costs to mine and clean coal, how hard it is to pass along higher costs in today's markets.

But *do* you know how much these increased costs can be offset by more efficient cleaning? Do you know *how much more coal you could now ship* if your cleaning plant could closely duplicate the washability curves of your coal?

Lost coal is lost profit. And at present costs and selling prices, cleaning efficiency can be the difference between a profitable operation and a "marginal mine."

Immediate practical answer? Based on the operating records, the unassailable answer is *true Heavy-Media Separation.*

Alone among cleaning processes, Heavy-Media Separation can closely duplicate the washability curves of your coal at any gravity from 1.25 to 2.50 over a full size range from 8" to 3/32". You set the gravity of the Heavy-Media "pool" for the quality your market demands. From then on, the Heavy-Media Separation unit automatically separates true float coal from unwanted refuse; continuously maintains the optimum separating gravity within ± 0.01; recovers and reconditions the medium and feeds it back to the separating pool. No matter how large and variable the refuse content of the raw feed, your Heavy-Media Separation unit recovers the shipping grade coal you mine—quietly, continuously, efficiently. Even on feeds with a high percentage of near-gravity boney coal, "misplaced material" is held to the very minimum.

HIGH RECOVERY ON HARD-TO-CLEAN FEEDS

Treating refuse from other washers and dumps containing only 15% coal, a Heavy-Media Separation plant recovers over 90% of the coal in this feed . . . actually recovers a higher percentage of coal from refuse than other methods recovered from the original raw feed.

Another Heavy-Media Separation unit is fed middlings and refuse containing up to 70% unmarketable material. Although the easy-to-separate fraction has already been removed, the Heavy-Media Separation unit makes a profitable separation, yielding a large tonnage of a marketable coal and a final high-ash refuse.

Another Heavy-Media Separation plant cleans 275 t.p.h. of total-seam mine feed containing as much as 44% refuse due to the inclusion of a heavy band of draw slate. Clean coal recovered averages 55%-60% of the raw feed, while Heavy-Media refuse (sink) going to the dump contains less than 1% marketable coal.

Still another Heavy-Media Separation unit treats refuse from mechanical cleaners containing only 30% to 50% recoverable coal. Heavy-liquid tests show that float-in-the-sink and sink-in-the-float average ½% respectively.

Building or modernizing a washer is a once-in-a-decade project. Why cut corners on first cost when the separating efficiency of the process you adopt will *affect your net profit so much for so many years to come.* Remember—no other cleaning process matches true Heavy-Media Separation in separating efficiency. No other process provides constant control, conditioning and recovery of the separating medium for maximum recovery of specification coal.

Your request for specific information on what Heavy-Media Separation can do on your coal will get prompt attention from a nearby Cyanamid Field Engineer.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA NEW YORK 20, NEW YORK

Cold Test

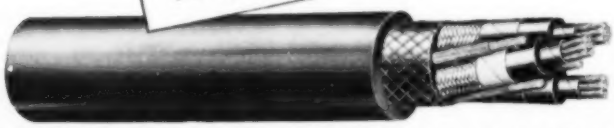
Exposure to sub-Arctic temperature is one of the ordeals these cables must undergo to prove their qualifications. The cables are conditioned for one week at -70° F. and, while at this temperature, bent around a mandrel having a diameter three times that of the cable for cables .55" and less in diameter. Larger cables are bent to greater diameters. This is one of the most severe ways of testing U. S. Royals.

U. S. ROYAL CABLES ARE COLD RESISTANT

7 reasons why U. S. Royal Cables mean safety:

Seven grueling laboratory tests, each of them tougher than actual conditions, guarantee U. S. Royal's resistance to moisture, abrasion, cutting, heat, cold, impact, flexing. United States Rubber engineers spare no effort in making sure U. S. Royal is a completely safe electrical cable. Write for your free copy of valuable booklet on mining cables to address below.

SAFETY TESTED



U. S. Royal Shielded Portable Cable Type SH-D

Products of U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE AND CABLE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, NEW YORK

"BOILING ACTION"...

HEAPS 'EM HIGH WITH THE BIG RED TEAM

YOU'LL get plenty of heaped loads with Bucyrus-Erie B-type Scrapers. Dirt *boils* up into bowl, is broken into small pieces to eliminate voids. You get a smooth, even, compact and *full* load.

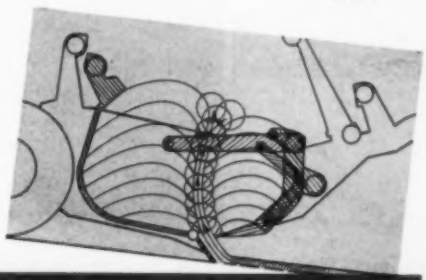
The Big Red Team — combination of Bucyrus-Erie B-type Scraper and International TD-24 tractor — not only loads full but loads fast and in a short distance and has moved more dirt at less cost than competitive units in one field test after another.

See your International Industrial Tractor Distributor for all details on the dirt hauling member of the Big Red Team . . . ask for a demonstration and see for yourself why it's your best bet for really low cost dirt.

"BOILING ACTION"

in B-type Scraper causes dirt to fountain through the load, spreading forward into apron and back into bowl for the heaped loads that mean big production.

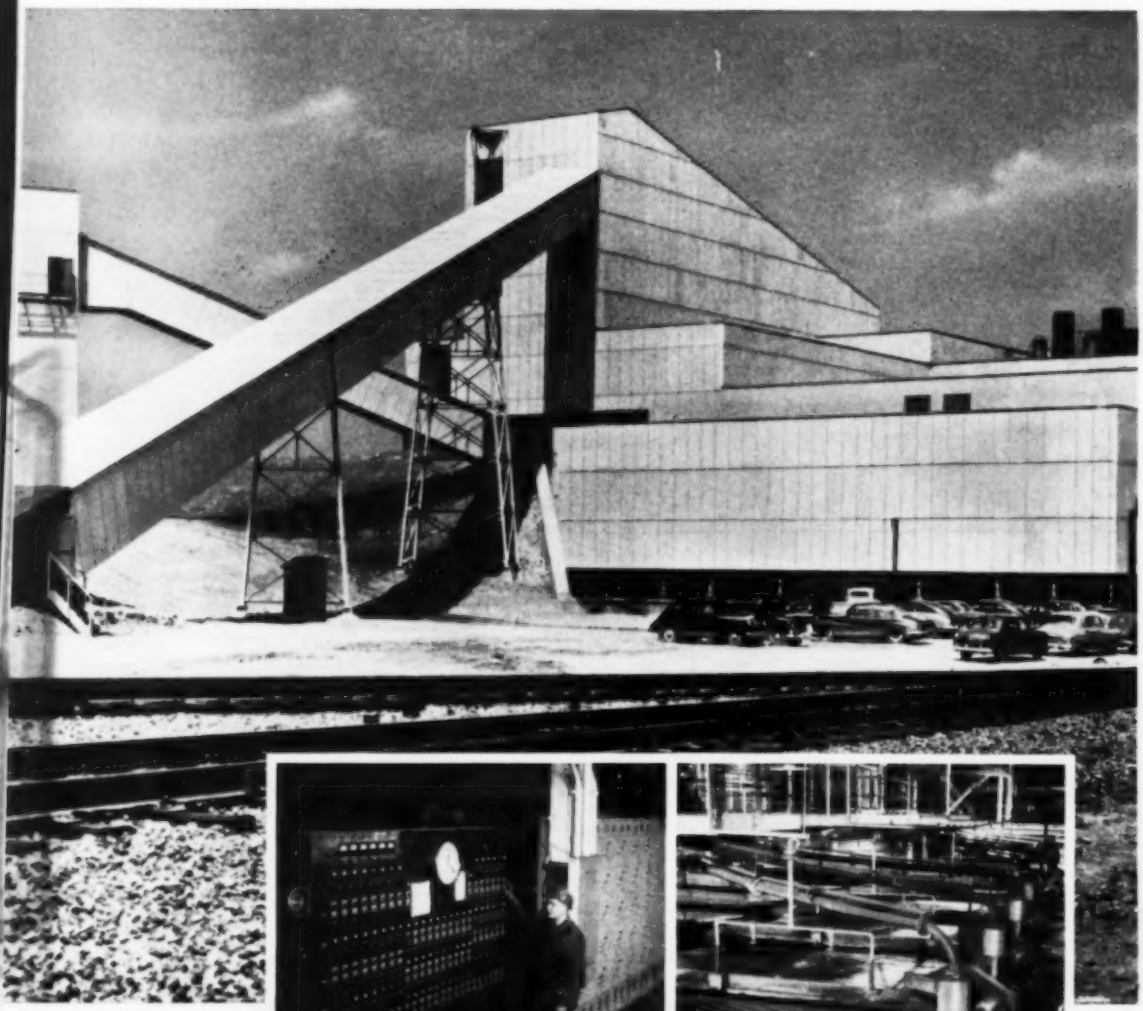
38T52C

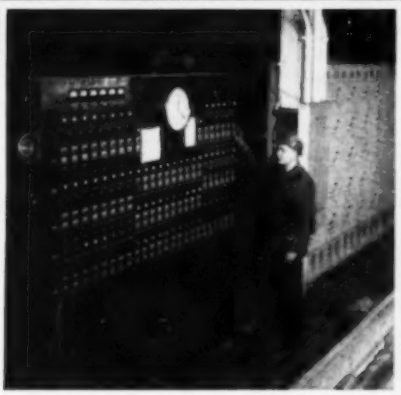


SOUTH MILWAUKEE BUCYRUS ERIE WISCONSIN

SEE YOUR INTERNATIONAL INDUSTRIAL TRACTOR DISTRIBUTOR

They did what you can do to produce more





Just one man can start or stop a whole operation from this modern centralized control station. Individual Westinghouse motor starters are grouped in clean, compact, spacesaving cabinets to the right of the control station.

Westinghouse Life-Line Motors, driving these Deister tables, never need greasing because they have pre-lubricated sealed bearings. Grease can't get out and dirt can't get in. Once they're installed you can forget about them.

How Planned Power helps clean 1500 tons of coal per hour

The new Georgetown Preparation Plant. The Hanna Coal Company, the Cleaning Plant Builder and Westinghouse engineers worked together in developing this highly productive operation that emphasizes automatic control with a minimum of man power.

At Hanna Coal Company's Georgetown Preparation Plant, modern methods of automatic control and efficient power distribution are used to speed up production and reduce costs. One result is that only five men are required to control the entire plant which cleans 1,500 tons of raw coal per hour.

Plant practically runs itself

Automatic, centralized control makes it possible for just one man to start or stop a whole operation from one central point. Centralized control also conserves valuable plant space and makes it easy to inspect and service controls.

No chance for conveyer pile-ups

The conveyers that carry coal all over the plant are specially interlocked to prevent pile-ups. If a stoppage occurs on one conveyer section, all those behind it will automatically stop.

Only three kwhr per ton of coal

Seven Westinghouse power centers deliver electric power to different operations efficiently and at the proper voltage. These, combined with highly efficient Westinghouse motors and gearmotors, contribute to the most economic utilization of power.

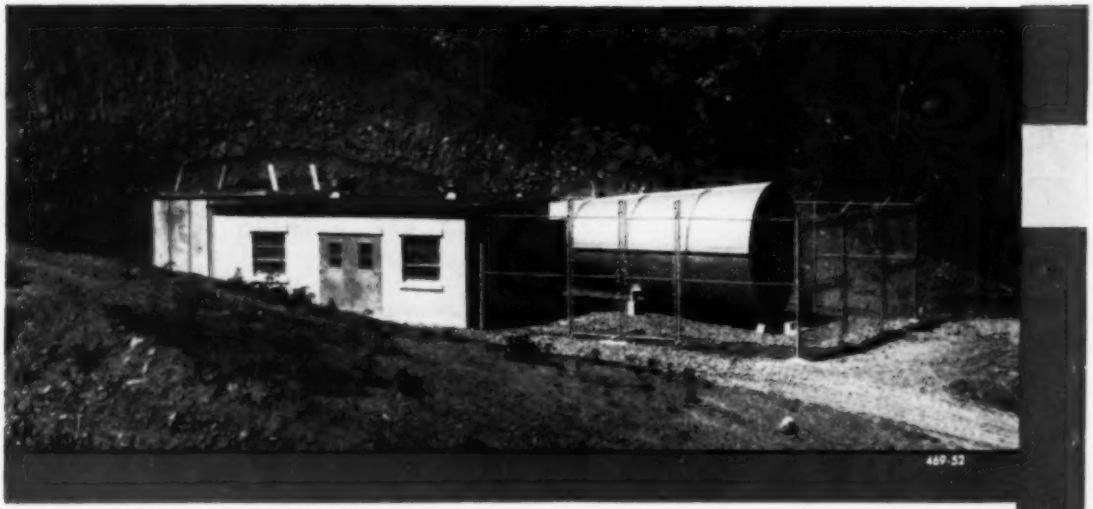
Loads a carload of coal every two minutes

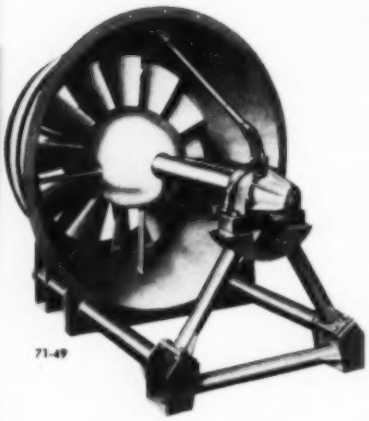
Another feature of this Westinghouse-equipped plant is in loading and weighing. One man loads five railroad cars at the same time, and on the average of a full car every two minutes. After loading, the cars are automatically weighed with the help of three electric eyes.

Call Westinghouse early on your next project

Westinghouse, the electrical manufacturer with the widest cleaning plant experience, can help you get benefits like these in your next project. Be sure to call us early in the planning state. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-94925

YOU CAN BE SURE...IF IT'S
Westinghouse
EQUIPMENT FOR MINING





Jeffrey 12-A-83 AERODYNE Mine Fan

EFFICIENT MINE VENTILATION calls for complete understanding of operating conditions, plus high volume equipment with flexibility to meet specific requirements. Every Jeffrey Fan installation is engineered for the job it is intended to do. That's where our Jeffrey Ventilating Engineers can be of service. Shown above is a typical AERODYNE installation at the Colorado Fuel and Iron Corporation property in Colorado. Here again is tried and proved ventilation.

JEFFREY AIR-OPERATED BAUM JIGS make possible a new high in capacity at minimum cost per ton of coal washed. Difficult separations are effectively made even at low specific gravities down to extremely small sizes. Unit shown (right) is a 72-inch, two-compartment, four-cell air operated Jig. It is cleaning 6″ x ⅜″, Pittsburgh seam coal—production averages 227 tons per hour with plant feed coal. For better cleaning at low cost, consult a Jeffrey Preparation Engineer.

THE JEFFREY MANUFACTURING COMPANY Established 1877

912 North Fourth St., Columbus 16, Ohio

Baltimore 2 · Boston 16 · Cincinnati 2 · Detroit 13 · Houston 2 · New York 7 · St. Louis 1
Beckley, W. Va. · Buffalo 2 · Cleveland 15 · Forty Fort, Pa. · Jacksonville 2 · Philadelphia 3 · Salt Lake City 1
Birmingham 3 · Chicago 1 · Denver 2 · Harlan, Ky. · Milwaukee 2 · Pittsburgh 22

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britian Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

JEFFREY

AERODYNE FANS

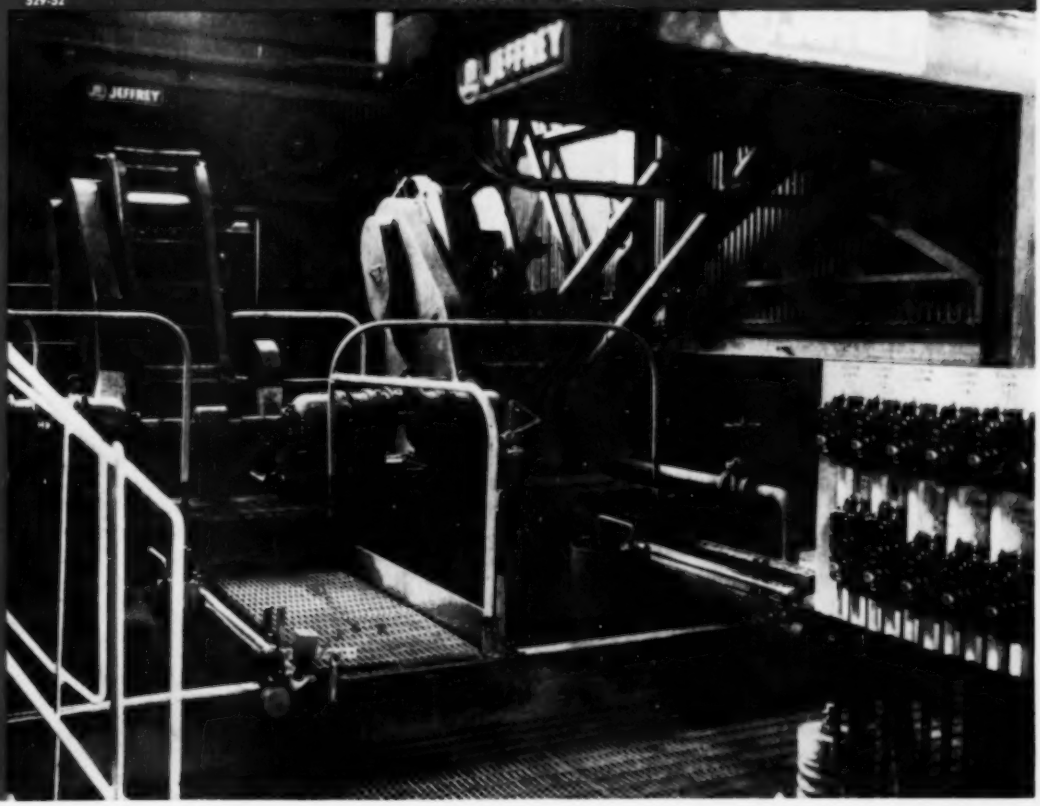
Assure efficient mine ventilation

BAUM JIGS

produce coal to meet exacting markets

Jeffrey 72-inch, two compartment, 4-cell air-operated Baum JIG

529-52



Watch the perfect control

BLASTING CLUES from the ATLAS MACHINE-GUN CAMERA

The A. E. Dick Contracting Co. got excellent confinement with the ROCKMASTER Blasting System in this stripping operation for the Hudson Coal Co. near Wilkes-Barre, Pennsylvania. There was no noisy air blast from wasted explosive gases . . . no flying rock to damage nearby equipment. There were 16 holes with 15 x 15 ft. spacing. Average depth of hole was 32 ft. and the burden was medium sandstone. ROCKMASTER electric blasting caps Nos. 1 to 6 were used in an alternate pattern.

1. *4000 lb. of dynamite ready to shoot. Note expensive equipment nearby.*

4. *Height of blast. All heave completely controlled. Minimum vibration.*

5. *Burden falls as first dust and smoke appear. Perfect blast control.*

See how ROCKMASTER can be put to work for you. Send for your reprint of the technical paper "Overburden Blasting Techniques" describing loading patterns for all principal types of overburden blasting.

ROCKMASTER GIVES MOST EFFICIENT USE OF FORCE, CONTROLLED THROW, MAXIMUM BREAKAGE.

in this ROCKMASTER® blast

2. *⅓ second after detonation shows excellent confinement of blast.*

3. *Burden still receiving full power of explosives—no escaping gases.*

6. *Spent gases finally make a quiet exit. Burden completely shaken.*

7. *Height of final pile shows excellent displacement for easy digging.*

ROCKMASTER REDUCES ALL THE NOISE, VIBRATION AND FLYING ROCK TO A MINIMUM.

ATLAS EXPLOSIVES

ATLAS

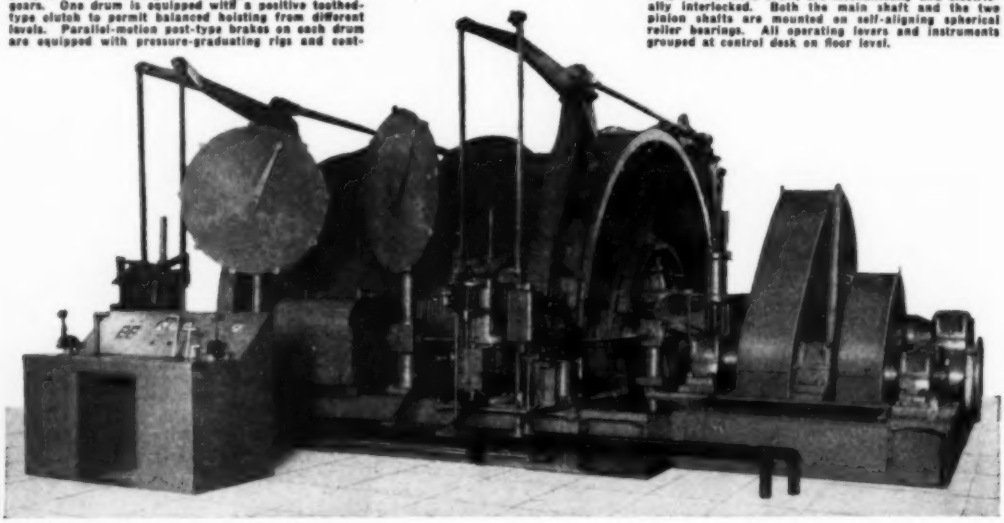
"Everything for Blasting"

ATLAS POWDER COMPANY • WILMINGTON 99, DELAWARE

Offices in principal cities

Shop assembly of very modern shaft hoist recently furnished to a metal mine in Australia. 12'—0" x 51" "built-up" all-steel cylindrical drums will be driven by a 600 hp. direct-current motor, with Ward-Leonard amplidyne control, through double-reduction herringbone gears. One drum is equipped with a positive toothed-type clutch to permit balanced hoisting from different levels. Parallel-motion post-type brakes on each drum are equipped with pressure-graduating rigs and controlled by modern safety devices which include man-safety feature and automatic throttle shut-off which prevents over-speeding at any point of travel. Brakes and clutch are both operated by oil-hydraulic engines and, on the loose drum, are mechanically and electrically interlocked. Both the main shaft and the two pinion shafts are mounted on self-aligning spherical roller bearings. All operating levers and instruments grouped at control desk on floor level.

FOR AUSTRALIA



All Over the World
VULCAN HEAVY-DUTY HOISTING EQUIPMENT
is helping free nations to develop their resources

Each of these three bulletins contains a wealth of specific information. Write for free copies if you can use them to advantage. Fully illustrated.

In this period of international cooperation, when all free nations are striving to increase their ability to resist aggression, we are proud of the important services being rendered by Vulcan engineers and Vulcan products to mining companies throughout the free world.

Coal, Copper, Iron, Lead, Zinc, and many other essential materials are being produced in greater volume today than ever before by the aid of Vulcan Hoists, Sheaves, Cages, Skips, and other heavy-duty hoisting equipment. The modern hoist illustrated and described above is only one of many recently built, or on order, to assure still greater production in the near future.

Write us regarding any present or prospective hoisting requirement. Our engineers welcome opportunities to make helpful suggestions—based on more than a hundred years of successful experience.

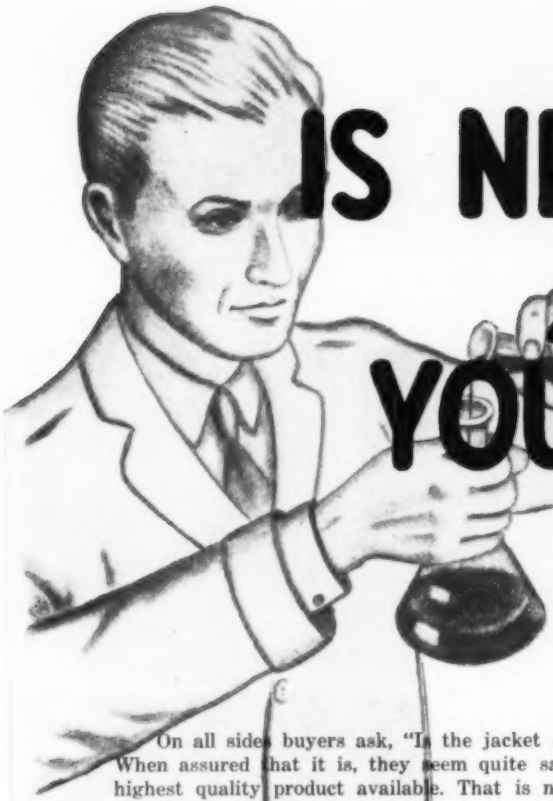
Vulcan Iron Works

ESTABLISHED 1849

Cable Address "Vulworks, Wilkes-Barre" **WILKES-BARRE, PA.** New York City Office, 50 Church Street

DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, CAGES, SKIPS, SHEAVES, ETC., CONVEYORS, ROTARY KILNS, DRYERS, ETC., AND ALL TYPES OF MINING LOCOMOTIVES

SEE OUR FOUR-PAGE INSERT IN THE McGRAW-HILL MINING CATALOGUES.



IS NEOPRENE ALL YOU WANT ?

On all sides buyers ask, "Is the jacket of that cord or cable neoprene?" When assured that it is, they seem quite satisfied that they are getting the highest quality product available. That is not necessarily a sound conclusion. Here's why.

Neoprene is only a raw material. To be of use it must be **properly** compounded with antioxidants, carbon black, vulcanizing agents, and other materials. In other words, technical skill in properly compounding neoprene is just as important as using neoprene itself.

TIREX Cords and Cables were the first to be made in this country with a heavy duty jacket. Proof of the fact that compounding skill is important is shown by the fact that in the intervening thirty years TIREX has kept the leadership in the field of portable cords and cables. Simplex skill developed the cords and then kept them leaders against all comers.

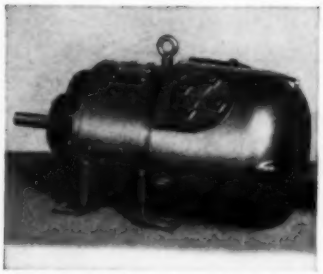
The next time you need a portable cord or cable specify and be sure you get Simplex-TIREX Cords and Cables. The name is embossed on the jacket for your protection!

SIMPLEX-TIREX IS A PRODUCT OF SIMPLEX RESEARCH

SIMPLEX TIREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

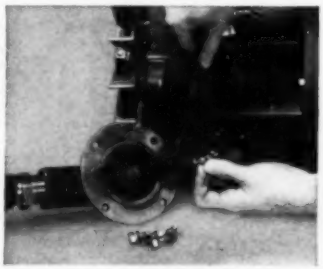
1 EASY-TO-INSTALL G-E mine motors are compactly built, occupy minimum space on mining machines. Cable gland does not protrude.



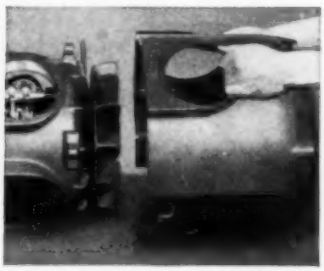
Standard hand-hole covers on top half of motors are easily removed, providing quick access to conveniently-located brushes.

Jig-drilled feet assure uniform mounting. Screw-in type lifting eye, at motor's center of gravity, speeds installation.

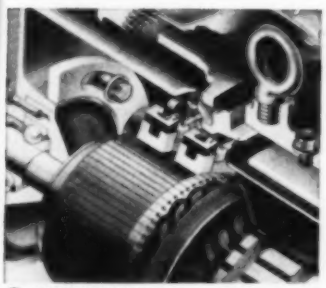
2 EASY-TO-MAINTAIN G-E mine motors have new two-stud brush construction with all brushes readily accessible.



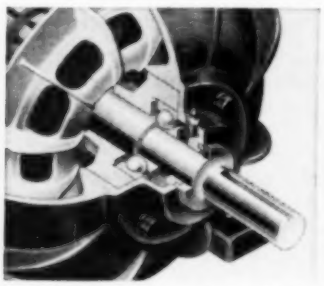
New cables can be connected in the mine, without removing end shield, thanks to gland design, and terminals on extra-long internal leads.



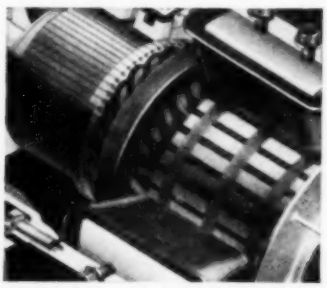
Sturdy, shock-resistant fan housing held in place with two machined fits, is easily removed to give access to external fan.



3 LONG-LASTING G-E mine motors have brush holders that are corrosion- and wear-resistant — provide adjustable brush pressure.



Ball bearings of generous capacity make the motor suitable for driving direct-connected, belted, geared, or chain-driven loads.



Moisture-resistant insulation system minimizes effects of moisture absorption which can cause mine-motor insulation failures.

Three ways new G-E mine motors help mining men reduce costs

Today's high-capacity mining machinery relies strongly on motor design, dependability and simplified maintenance to keep costs low.

The three features pictured above—ease of installation, ease of maintenance, and long life—show how the new General Electric mine motor meets these requirements. For complete data, ask your nearest G-E Apparatus Sales Office for Bulletin GEA-5553. Or write to General Electric Company, Section 663-32, Schenectady 5, New York.

GENERAL ELECTRIC

So DIFFERENT... They're Patented!

Power Plus Anti-Rust Protection at No Extra Cost

Here are fuels so *different* they have been PATENTED—so *revolutionary* in action that they result in actual dollar savings for Sinclair users.

How? Sinclair fuels—and *only* Sinclair—contain the rust inhibitor RD-119®. This amazing chemical forms an invisible waterproof film throughout the equipment's fuel system—from fuel tank to combustion chamber. Used regularly in gasoline engines, Sinclair Gasoline with RD-119 *prevents* rust and corrosion—can save you costly repairs to carburetors and fuel pumps. Regular use of Sinclair Diesel Fuel containing RD-119 eliminates the problem of rust-clogged injectors.

Now, get *Full Power, High Anti-Knock* PLUS the *Anti-Rust Protection* of RD-119—exclusive with Sinclair... AT NO EXTRA COST! Phone your local Sinclair Representative today about Sinclair Anti-Rust Fuels.

Sinclair Refining Company, 600 Fifth Ave., New York 20, N. Y.

Hard Going is Easy Going

WITH MACK SIX-WHEELERS

It's really something to see—the way a Mack six-wheel truck shoulders a back-breaking load and without fuss or bother rolls effortlessly over the roughest terrain.

The reason why? Because only Mack six-wheel trucks have the unique advantage of Mack's time-saving, money-saving Balanced Bogie with exclusive Mack Power Divider.

With the Mack Power Divider you get positive traction under the most adverse conditions —through hub-deep mud, through slippery sand, or over rock-strewn uneven ground. Acting as a true differential, the Power Divider delivers torque between the two bogie axles and between the four driving wheels in proportion to wheel traction, thus eliminating useless wheel slippage and spinning.

The ability of Mack six-wheelers to keep going—even under conditions that stop other trucks cold – means greater profits for you through bigger payloads on faster, uninterrupted schedules. Write or call your nearest Mack branch or distributor for a factual study of your particular operation.

Heavy loads and rough terrain point up the ability of Mack six-wheel trucks to turn hard going into easy going.

Mack TRUCKS

outlast them all

Mack Trucks, Empire State Bldg., N. Y. 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

SOLDERING ARMATURE COIL LEADS

without a Soldering Iron?

Soldering armature coil leads to risers by hand leaves a lot to the human element. So three years ago, National developed a way to solder by induction heating. It's quicker.

More uniform. *Reduces liability of premature trouble.* If you've wondered why a motor or generator repaired or redesigned by National gives such excellent service . . . it's the "little" things like this which National does, unheralded and unsung, that count so much. They mean a lot *in the long run.* Use National coils and engineering service for the unannounced advances which add so little to cost, so much to value.

Soldering armature coil leads to risers with National-designed induction heating equipment in the National plant.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A.

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

EASIER TO HANDLE

LASTS LONGER

FASTER TO INSTALL

COSTS LESS

...THAT'S WHY MINING MEN DEMAND *Carlon*

Hundreds of installations have proved that CARLON IS THE ANSWER TO MINE PIPING PROBLEMS. No other pipe gives you all the advantages of CARLON plastic pipe.

CARLON IS FASTER TO INSTALL . . . Flexible and furnished in long lengths . . . requires fewer fittings . . . makes-up faster, without special tools.

CARLON IS EASIER TO HANDLE . . . Weighs only 1/8th as much as metallic pipe . . . one man can handle 400-foot coil . . . no rigging equipment needed.

CARLON LASTS LONGER . . . Impervious to sulphurous waters, alkalies, acids, metallic salts and other corrosive wastes . . . **guaranteed** against rot, rust and electrolytic corrosion . . . has served over four years without maintenance under extremely severe mine conditions.

CARLON COSTS LESS . . . Cuts installation costs to minimum and last many times longer than ordinary pipe, yet initial price is about the same.

To be sure you get the best mine pipe available today, demand CARLON . . . SPECIFY THE PIPE WITH THE STRIPE!

NOM. SIZE	O.D.	I.D.	EST. BURST P.S.I.	WT. LBS. PER FT.	SHPG. LENGTHS
½"	0.840	0.622	540	0.103	400 ft. coils
¾"	1.050	0.824	350	0.140	400 ft. coils
1"	1.310	1.070	200	0.181	300 ft. coils
1¼"	1.660	1.380	200	0.267	300 ft. coils
1½"	1.900	1.610	200	0.320	250 ft. coils
2"	2.378	2.070	170	0.445	200 ft. coils
2½"	2.875	2.469	170	0.680	200 ft. coils
3"	3.504	3.070	165	0.910	100 ft. coils
4"	4.504	4.030	150	1.250	25 ft. str.
6"	6.630	6.070	115	2.230	25 ft. str.

ALL CARLON PIPE AND FITTINGS ARE FACTORY TESTED FOR MORE THAN 8 HOURS AT GREATER THAN WORKING PRESSURES.

Write for Catalogs.

CARLON CP 710-CP

CARLON PRODUCTS CORPORATION

PIONEERS IN PLASTIC PIPE!

In Canada: MICRO PLASTICS, Ltd., Acton, Ontario

10300 MEECH AVENUE • CLEVELAND 5, OHIO

Ashland special DIESEL

fuels and lubricants

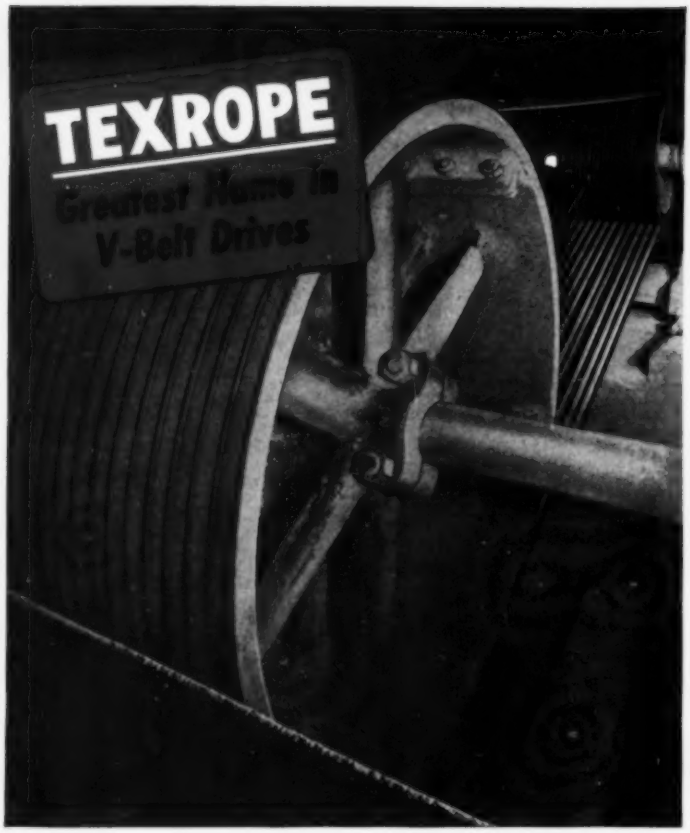
Services of the above Ashland Oil laboratory for testing oil and lubricants is available, without charge, to users of Ashland, Valvoline and Enarco products. Here is a valuable aid to all operators of diesel engine, truck fleets, railroad and marine equipment who furnish samples of used oils for tests. It will help keep your diesel equipment on the job, operating efficiently and economically.

Phone or write our nearest office and learn how our engineering department can help you — and save your dollars.

ASHLAND OIL & REFINING COMPANY

ASHLAND, KENTUCKY

SUPPLY TERMINALS: Ashland, Ky. — Buffalo, N. Y. — Canton, O. — Cleveland, O. — Evansville, Ind. — Findlay, O. — Freedom, Pa. — Kenova, W. Va. — Louisville, Ky. — Marietta, O. — Nashville, Tenn. — Niles, O. — Paducah, Ky. — Pittsburgh, Pa. — St. Louis, Mo. — Toledo, O.



Everything in V-Belt Drives

from one reliable source!

GRIT, VIBRATION AND SHOCK LOADS make quarry operations tough on drives. Allis-Chalmers has both the engineering experience and the drive equipment to lick both the usual and unusual problems. Call your nearby Allis-Chalmers distributor or district office for help on your drive problems, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3849

Texrope and Magic-Grip are Allis-Chalmers trademarks.

ALLIS-CHALMERS

TEXROPE Grommet V-Belts—20 to 50% longer life than ordinary belts. Size for size, grommet belts give 1/3 more gripping power, pull heavier loads with higher safety factor.

STANDARD CAST IRON SHEAVES — Made to order from stock patterns. One to 14 grooves for A, B, C, D or E belts. One to 1000 horsepower. Split sheave or split hub.

MAGIC-GRIP SHEAVES — Semi-steel casting with interchangeable, patented taper bushings. On and off in a jiffy. Cannot shake loose. Two to 12 grooves for B, C and D belts: 2 to 250 hp.

Sold . . .

Applied . . .

Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

New Kennametal plant . . .

. . . producer of quality tools for the mining industry

Kennametal's modern plant at Bedford, Pennsylvania, is devoted exclusively to the manufacture of mining tools. Specialized machinery and equipment, conveyor systems, and intricate devices for quality control are installed in the 24,000 square feet of floor space.

BULLETIN M-152

KENNAMETAL INC. • MINING TOOL DIVISION • BEDFORD, PA.

CUTTER BIT
STYLE UBR3
KENNAMETAL
UBR3
DRILL BIT
STYLE D
KENNAMETAL
ROCK BIT
STYLE PA
KENNAMETAL
ROOF BIT
STYLE HFD

QUALITY THAT CUTS COSTS

Kennametal Inc. has patented processes and compositions that give Kennametal Mining Tools characteristics superior to all other carbide tools. No other carbide lasts as long, needs reconditioning so seldom, or causes so little strain on equipment. Bit cost per ton is nearly always less.

MINE TO MINE CONTROL

Kennametal alone has complete facilities for producing carbides from raw material to finished tools. We mine our own ores in Nevada and California, take them to our own plants for the complex phases of refining, and manufacture. Nearly a million square feet of floor space is used for research, engineering, refining, developing, and manufacturing Kennametal products.

INTENSIVE FIELD SERVICE

The sales and service staff of the Kennametal Mining Tool Division are qualified experts with a total of 300 years of actual mining experience. Each man is a resident in his territory, thoroughly familiar with local mining conditions. He knows which of the hundreds of sizes and types of Kennametal bits, augers, rods, and other tools can solve a particular cutting or drilling problem, and can set up and demonstrate in the mine.

ADVANCED DESIGN

The design of Kennametal Mining Tools is often imitated, but never equalled. Kennametal engineers work constantly on new tool designs and the improvement of existing ones. Two current examples of Kennametal's leadership are the UR and HFD Bits, which were planned and developed so that they now offer greatest wear-resistance as well as maximum freedom of operation.

SPECIAL APPLICATIONS

Kennametal has frequently developed bits and methods for solving special cutting and drilling problems. Typical examples are the development of hitch timbering with SD Bits, and the technique of efficient long hole drilling for exploration, ventilation, safety, conduits, and gas bleeds. Kennametal engineers and representatives, always at the service of mining men, have practical experience in the solution of such special problems.

PROPER MAINTENANCE

The simple maintenance procedures for Kennametal mining tools make it easy to get more tonnage per shift, and more shifts per bit life. Complete instructions on grinding, the establishment of grinding schedules and the conversion, if necessary, of present equipment to wet grinding is always readily available from a Kennametal representative or from our Bedford Plant.

the Kennametal Cutter Bit

Master of All Cutting Conditions

World's largest manufacturer of Tungsten-Carbide Mining Tools

KENNAMETAL *Inc.*

MINING TOOL DIVISION

BEDFORD, PA.

General Offices and Main Plant at Latrobe, Pa.

NOW... G-E Super Coronol* rated at 85 C copper temperature

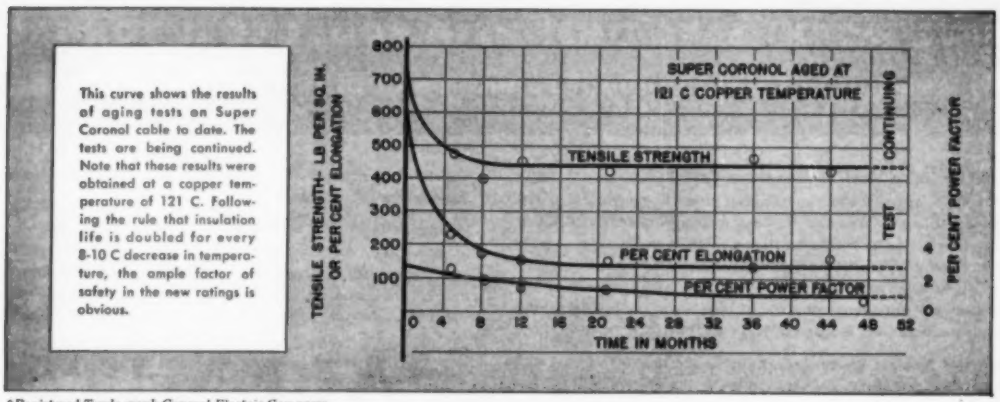
NEW HIGHER RATING APPLIES TO ALL SIZES FOR 0- TO 8000-VOLT SERVICE

General Electric announces that effective immediately it is basing the ratings of all Super Coronol power cables for service up to and including 8000 volts on a permissible maximum copper temperature of 85 C. To our knowledge this is the highest rating ever announced for a solid dielectric power cable in this voltage range. For voltages above 8000, ratings continue to be based on 80 C.

The new temperature ratings mean that Super Coronol cables are now capable of carrying up to 12 per cent more power, continuously, than old-style ozone-resisting rubber-type compounds rated 75 C maximum.

This higher rating is a conservative increase, based on life tests of many cables taken from regular production. Most severe, and at the same time, most impressive of these tests involves cable held continuously under load at a copper temperature of 121 C. This test is now nearing the end of its 5th year. Both physical and electrical properties have been stable since the 20th month. In view of such results, the new rating is still extremely conservative—*and can safely be applied to all Super Coronol cable now in service at potentials up to 8000 volts.*

G-E cable specialists in your area will be glad to help you calculate just what this new rating means in current-carrying capacity in any specific installation—both for continuous loading and for emergency overloads. Or you may wish to write Section W45-914, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.


This curve shows the results of aging tests on Super Coronol cable to date. The tests are being continued. Note that these results were obtained at a copper temperature of 121 C. Following the rule that insulation life is doubled for every 8-10 C decrease in temperature, the ample factor of safety in the new ratings is obvious.
TENSILE STRENGTH- LB PER SQ. IN. OR PER CENT ELONGATION
800
700
600
500
400
300
200
100
SUPER CORONOL AGED AT 121 C COPPER TEMPERATURE
TENSILE STRENGTH
PER CENT ELONGATION
PER CENT POWER FACTOR
CONTINUING TEST
4
2
0
PER CENT POWER FACTOR
0 4 8 12 16 20 24 28 32 36 40 44 48 52
TIME IN MONTHS

*Registered Trade-mark General Electric Company

Single conductor-Geoprene jacket | Single conductor shielded Geoprene | Pre-assembled aerial cable | Mine Power Cable | Two-conductor concentric lighting cable

GENERAL ELECTRIC

Helping "STRIP" the excess from strip mining costs!

Alemite "Friction Fighters"

SAVE WORK! SAVE TIME! HELP BOOST COAL TONNAGE

By keeping vital equipment running smoother, producing longer!

Alemite Helps Slash Maintenance Costs!
Out on the strip—under the toughest, most exacting working conditions—Alemite "Friction Fighters" bring the protection of safe, sure lubrication to trucks, tractors and giant shovels *right on the job!* Genuine Alemite Bucket Pumps, compact, lightweight, fully portable, have the power and "push" to thoroughly flush out old grease and gritty coal dust from bearing surfaces. Help keep equipment running longer—at less cost!

Alemite Assures Clean, Safe Lubrication Fast!
Above ground or below ground, there is a better Alemite method for transferring, loading or applying grease. An Alemite method designed to speed and simplify lubrication. And with Alemite, lubricants are always kept "refinery clean." You save time . . . save grease . . . save work.

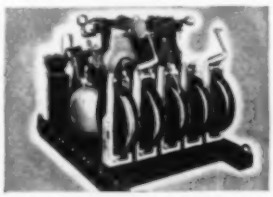
Alemite Reduces "Downtime" . . . Saves Man Hours!
Faster, easier Alemite methods reduce machine "downtime" for lubrication. Help increase coal tonnage. Check the proven Alemite models shown below. See how they can help *you* reduce bearing failures . . . increase the output of both your men and machines!

A PRODUCT OF SW STEWART-WARNER

ALEMITE

Lubrication Methods That Cut Maintenance Costs

These Alemite "FRICTION FIGHTERS" will help cut your costs!



Portable Service Stations. Bring a complete lubrication department right to the job. Standard Duty Units (shown above) are Sectionalized to fit your needs. Deliver lubricant direct from 100 lb. drums.

Easy to Operate. Easy to fill and use. Alemite Lever-Type Hand Guns are built for rugged wear and trouble-free service. Shown above: Model 6679-J, up to 6,000 lbs. pressure. Hose Model 6829-A.

Big Volume, Sturdy. Alemite Bucket Pump. Handles all regular pressure gun or gear lubricants. Tough, top quality construction. Develops 3,000 lbs. pressure with ease. It's Alemite Model 6821-B.

MACWHYTE

PREformed . . . Internally Lubricated

WIRE ROPE

for all equipment

From Macwhyte's complete line of a thousand and one sizes and types you get rope best suited to your equipment, designed, PREformed, and internally lubricated to provide long, safe service. (Catalog G-15.)

Wire Rope

SLINGS

for lifting and moving materials and equipment in production or maintenance.

There are hundreds of types and sizes of Macwhyte Flat-Braided, Round-Braided, Single-Part, and Grommet Slings. All are custom made in length, capacity, and flexibility to meet your needs. (Catalog S-8.)

Wire Rope

ASSEMBLIES

for machine parts, controls, and operating devices.

Macwhyte Safe-Lock wire rope assemblies are made to order in length, strength, and flexibility desired. Terminals are permanently attached to one or both ends. There are many standard types. (Catalog 5201.)

Macwhyte Company, 2931 Fourteenth Avenue, Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope and Wire Rope Assemblies. Mill depots: New York • Pittsburgh • Chicago • St. Paul • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.

Catalogs are available on request to Macwhyte Company or authorized distributor.

1016 SW

ANOTHER

American CRUSHER USER-REPORT

OVER 1,000,000 TONS ROM AND SCREENINGS, REDUCED TO 3/8" PRODUCT AT PARTS REPLACEMENT COST OF ¼ CENT PER TON!

American 24-S Crusher installed 23 years ago for Acme Steel Co., Riverdale, Ill. Still in active daily use!

OPERATION REPORT ON AMERICAN CRUSHER

Description of product handled and reduction made.
Screenings to 3/8" (Coal)

What tonnage is handled on an annual basis? 40 to 50 Thou. Tons

Estimate of annual Maintenance Labor on this crusher $500 to $1000 per year

We'd appreciate any comments you will give on the operation of this crusher It is a very satisfactory machine and has stood all the use and "ab-use" to which it was subjected.

Remember when the Graf Zeppelin made its history-making trip around the world? The year was 1929. It was in that same year that the American 24-S Crusher shown here was installed for the Acme Steel Co. of Riverdale, Ill. Many years have slipped by since then—but year after year this American has, in the words of the owner, "stood all the use and abuse to which it was subjected" in reducing ROM to a 3/8" product.

Proof-of-performance is now a matter of record—23 years of constant service for a total parts-replacement cost of $2702.35, or about ¼¢ per ton of coal crushed!

Write for Coal Crusher Bulletins.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Ave.
St. Louis 10, Mo.

Men get less tired!
Safety records improve!
Tonnages rise!

TAKE the hardest part of the work out of drilling and speed it up, too. Equip your miners with Le Roi-CLEVELAND HC10 Air-feed Sinker Drills — then watch tonnages per man-shift go up.

A lightweight column — pneumatic- or screw-type — supports the HC10. Setting-up takes only a few minutes. Feeding is done by air-pressure. All controls are handy.

Quick reverse feed makes it quick and easy to change steels. There are no swing or dump nuts to loosen or tighten.

The fast, light blows of Le Roi-CLEVELAND Air-Feed Sinker Drills are just right for carbide bits. You get maximum bit life — can use smaller bits for higher drilling speeds.

In addition to the popular HC10 model with 45-lb. drill, Le Roi-CLEVELAND Air-feed Sinker Drills are available in an HC23 model with 3⅛" bore. Both models help your miners produce more footage and greater tonnages. And because the men don't get so tired, safety records improve.

Write today for complete information.

LE ROI COMPANY RD-44
CLEVELAND ROCK DRILL DIVISION
12500 Beren Road, Cleveland 11, Ohio
Plants: Milwaukee, Cleveland and Greenwich, Ohio

RECOVER COAL FINES WITH EIMCO AGIDISC

Eimco Agidisc filters are heavy-duty, dependable machines built for continuous 24 hour operation in dewatering fine coal. These filters will:

1. Reduce moisture content in the fine coal to 15% or better, depending on the other plant equipment.

2. Produce a clear filtrate which contains less than the allowable ppm solids permitted under existing anti-pollution laws.

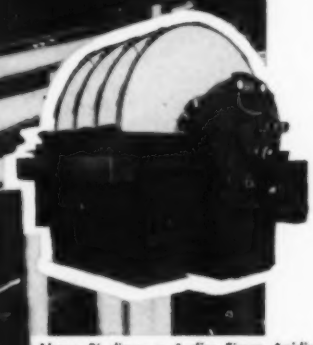
3. Permit uniform cake distribution over the entire surface of the disc with a resultant even drying of the fine coal filter cake.

4. Produces greater tonnage of dewatered coal per square foot of filter surface.

5. Save a product that has been considered too expensive to process—providing additional profits per ton of coal washed.

6. Pay for itself in a very few months.

Eimco Agidisc filters are doing an outstanding job in many coal washing plants and coal pond reclamation projects. Arrangements can be made to put a test unit in your plant. If you are interested please write.



Above 8' diam. x 4 disc Eimco Agidisc filter—below in prominent washing plant. Battery of 8' diam. x 10 disc Eimco filter.

A410

EIMCO

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

EXECUTIVE OFFICES AND FACTORIES - SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

NEW YORK, 51-52 SOUTH STREET • CHICAGO, 3319 SOUTH WALLACE STREET
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EL PASO, TEXAS, HILLS BUILDING • BERKELEY, CALIF., 637 CEDAR STREET
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
IN ITALY: EIMCO ITALIA, S.P.A., MILAN, ITALY

Goodman's NEWEST SWING-MOTION LOADER

19562

for trackless mining in low coal

26½" over-all height 17½" coal line height

LOADING CAPACITY 8 TONS PER MINUTE

Swinging Loading Head	40° to either side of centerline. 14-foot loading path with only forward and backward tramming. Good cleanup, corners loaded out, close posting no handicap. Operator always in safe position, back from face and away from rib.
Swinging Discharge End	40° to either side of centerline. When combined with swing of head, crosscuts can be driven at 90° angles in close work without double handling of coal; pillars can be loaded with maximum recovery.
Vertical Lift of Loading Head	From 12" below mine bottom to 19" above. Tight coal can be attacked at most desirable height; coal on irregular bottom loaded out without digging in.
Vertical Adjustment of Discharge End	Can be raised or lowered for correct discharge height into conveyor or shuttle car.

ADDITIONAL TIME-SAVING, MONEY-SAVING ADVANTAGES OF THE TYPE 865...

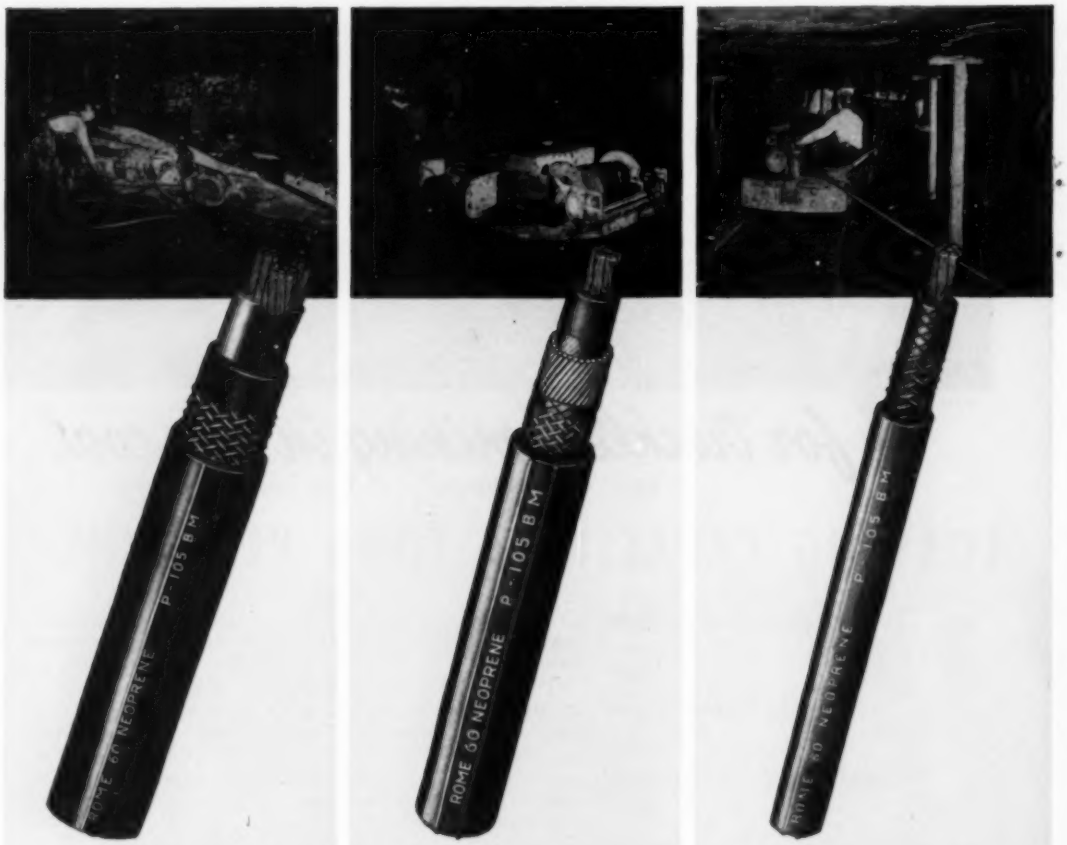
rugged, heavy construction throughout, with extra strong gathering chains and conveyor chain • 74" width gathering head; 24" width rear conveyor for high capacity • full hydraulic control • two 10 hp motors for tramming and driving hydraulic pumps; two 20 hp motors for driving the gathering chains and conveyor chain • accessibility of all working parts

Goodman
MANUFACTURING COMPANY
Halsted Street at 48th • Chicago 9, Illinois

Along with Goodman's skill and experience in designing and building loaders, goes Goodman's thorough analysis of your particular mine problems, assuring you profitable operation—complete satisfaction.

Cutting Machines Conveyors Loaders Shuttle Cars Locomotives

Use Rome 60 Mining Cables



Rome 60 Portable Power Cables —two, three and four conductors

Type G (grounded) up to 5000 volts
Type W (ungrounded) up to 3000 volts

This heavy-duty, multiconductor portable power cable is particularly recommended for use of electric shovels, loaders, mucking machines and other equipment where delivery of a heavy power load is required. Conductors are assembled with rubber-like fillers to protect against rotting and mechanical injury—ensure maximum flexibility.

Rome 60 Concentric Mining Machine Cables—600 volts

This two-conductor cable combines maximum flexibility with minimum diameter in a round construction. (Second conductor is concentrically stranded around insulated center conductor.) Recommended for cutting machines and other off-track equipment.

Rome 60 Single Conductor Locomotive Gathering Cable —600 volts

Strong adhesion between conductor and insulation, as well as between insulation and tough Neoprene sheath makes this the ideal locomotive cable.

for *All* Your Mechanized Equipment

Rome 60 Flat Twin (Parallel Duplex) Mining Machine Cable —600 volts

Type G (grounded)
Type W (ungrounded)

Here is the popular shuttle car cable. Flat construction permits compact reeling. Neoprene web between conductors protects against mechanical shock and short circuits.

Rome 60 mining cables are designed for the roughest, toughest jobs. They're made for a long life of gruelling service on mechanized equipment.

A sturdy, open-braid reinforcing permanently interlocks or "gears" the conductors to the protective sheath. No possibility of loosening or sheath separation here, yet utmost flexibility is assured.

The sheath itself is all-resistant Neoprene, molded in lead to a tire-like toughness. It is resistant to moisture, flames, acids, oils, abrasions. A specially compounded heat-resistant rubber insulation, suitable for operation at 75°C., provides maximum overload protection.

Investigate *Rome 60* mining cables and you'll see why so many mines standardize on them.

Rome manufactures a complete line of cords and cables for mine use. "P-105 BM" molded in the Neoprene sheath is your assurance of compliance with Federal and State of Pennsylvania safety codes. In addition to the cables shown, the *Rome 60* line includes:

- **TYPE SO PORTABLE CORDS**
- **SHOT FIRING CORD**
- **MINE POWER DISTRIBUTION CABLE**
- **SHOVEL AND DREDGE CABLE**

FOR MINE AND COAL PREPARATION PLANT USE
Rome also offers a wide selection of power and control cables, building wires—both rubber and thermoplastic insulated, as well as portable cords for small tool use. All are manufactured to Rome's high-quality standards—your assurance of long, dependable service.

It Costs Less to Buy the Best...

ROME CABLE
Corporation
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

ROME CABLE ROME, N.Y.

TRACK LIKE THIS MEANS BETTER, FASTER HAULAGE

Such perfect track fairly invites high-speed haulage. Trips on a layout like this can be routed through fast—and they get there safely.

Bethlehem has worked out many prefabricated track systems for coal mines, and the one shown here is a recent example—one of particular interest. Note that elaborate double crossover, complete with switchstands, switches, frogs, guard rails, braces, tie plates, and everything else needed for modern, high-speed mine track. Note the size of the rail and the general sturdiness of the track structure. This is a layout designed for the heavyweight loads—a system built with an eye to the future as well as the present.

Prefabricated mine track, both surface and underground, has been a Bethlehem specialty for many years. Each and every layout is engineered to meet the requirements of the individual mine. So, whatever your haulage problems, call us in; we'll gladly study the set-up and tailor the track to your needs. Rails will be cut to the proper lengths, curved to the proper radii; everything will be ready for quick assembly when it reaches you.

Phone or write the nearest Bethlehem office for full details. We'll gladly supply complete information at your convenience.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM PREFABRICATED TRACK

H&P Cyclone Thickeners and Housing

DESLIMING Ahead of FROTH FLOTATION with H+P CYCLONE THICKENERS

Increases Froth Product and Reduces Preparation Costs

At DeBardeleben Coal Corp., Empire, Alabama, the normally-wasted sludge from the coal cleaning plant is pumped to a battery of four 14" H & P Cyclone Thickeners where 1200 gpm is thickened and deslimed at approximately 325 mesh. The overflow is discarded as refuse and the deslimed underflow is sent to a conditioner tank and then to the froth flotation cells.

Froth Flotation Cells

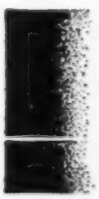
Conditioner Tank

This practice produces a greatly increased tonnage of froth product; makes a substantial reduction in reagents; contributes greatly to the quality of the cleaned product; and substantially reduces the cost of preparation. Also, in this particular installation, the ash content of the underflow is greatly reduced from that of the Cyclone feed.

The use of Heyl & Patterson Cyclone Thickeners by the DeBardeleben Coal Corporation at Empire, Alabama for desliming ahead of froth flotation marks another successful application of this versatile equipment in the mining and preparation fields.

H & P Cyclone Thickener equipment is a proven means of controlling solids in circulating systems and separating solids from liquids. H & P Cyclones also provide an economical and practical answer to Classification and Thickening problems.

Heyl & Patterson laboratory and field tests have provided a sound basis for predicting accurately the Cyclone performance on most feeds. For more information send for Booklet 5-CT-51 or send us your problem and we will tell you how an H & P Cyclone application can provide the answer.



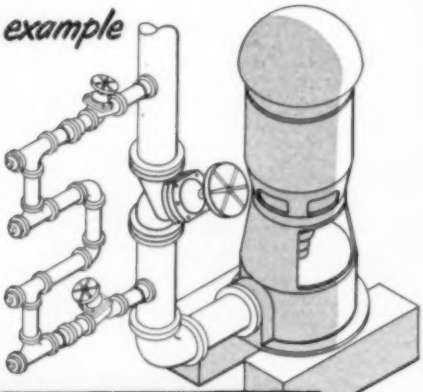
Cyclone Thickeners
Thermal Dryers
{The Drying Dutchman / Rotacrold Centrifugal Dryer}
Thurston Coal Handling Systems
Rotary Mine Car Dumpers
Coal Crushers
Coal Preparation Plants
Bradford Breakers

Heyl+Patterson, Inc.

"SINCE 1887"

55 WATER STREET · PITTSBURGH 22, PA.

How's This For Solving a Valve Problem ...on Corrosive Well Water, for example



THE INSTALLATION

On outlet of well water pump supplying plant of Barr Rubber Products Co., Sandusky, Ohio. Sulphur content of water extremely high.

VALVE SERVICE RATINGS

SUITABILITY:	Just what was needed
MAINTENANCE COST:	None to date
CORROSION-RESISTANCE:	No evidence of corrosion
SERVICE LIFE:	Outlasted any 2 other valves so far
OPERATING RESULTS:	Pump shutdowns for valve repairs stopped
PRICE:	Much less than alloy valves
AVAILABILITY:	Stock item in Crane line

THE HISTORY

Valves formerly used here lasted no more than 6 months. Under constant exposure to severe erosive and corrosive effects, they failed to provide the easy operation and positive seating needed in this service. They required excessively frequent re-packing and seating maintenance.

Problem solved by replacing with Crane Packless Iron Body Diaphragm valves in main line and by-pass. Installed more than a year, they show no corrosion, no effects of service. Operate smoothly, seat tightly, with no maintenance needed to date.

THE VALVE

Crane No. 1611 Iron Body Packless Diaphragm Valves featuring separate disc and diaphragm. No packing to maintain; no stem leaks. Neoprene diaphragm used to seal bonnet only. Independent disc with neoprene insert insures positive seating even should diaphragm fail. Also fully neoprene lined valves. Many common and corrosive services. See your Crane Catalog or Crane Representative.

The Complete Crane Line Meets All Valve Needs. That's Why,

More Crane Valves Are Used Than Any Other Make!

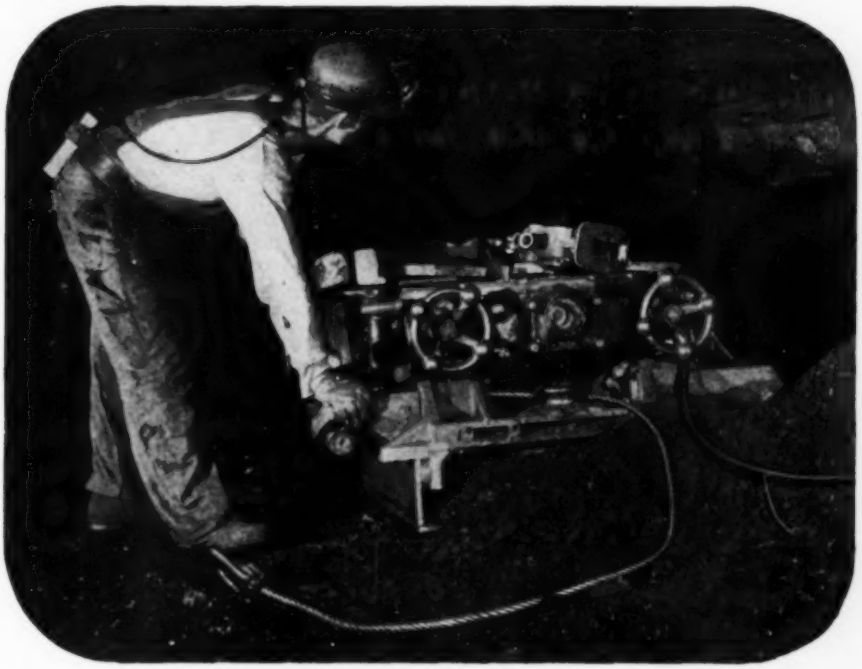
CRANE · VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois

Branches and Wholesalers Serving All Industrial Areas

VALVES · FITTINGS · PIPE · PLUMBING · HEATING

MINING MACHINE CABLES



3 reasons why you'll save money with Roebling cables

ROEBLING Roeprene Mining Machine Cables are designed and built to stay on the job longer and save money. In the first place, their neutral is made of flat, braided copper which provides maximum elongation and flexibility in every direction. Next, the neutral is covered with braided cotton which cushions and reduces abrasive action between copper and insulation.

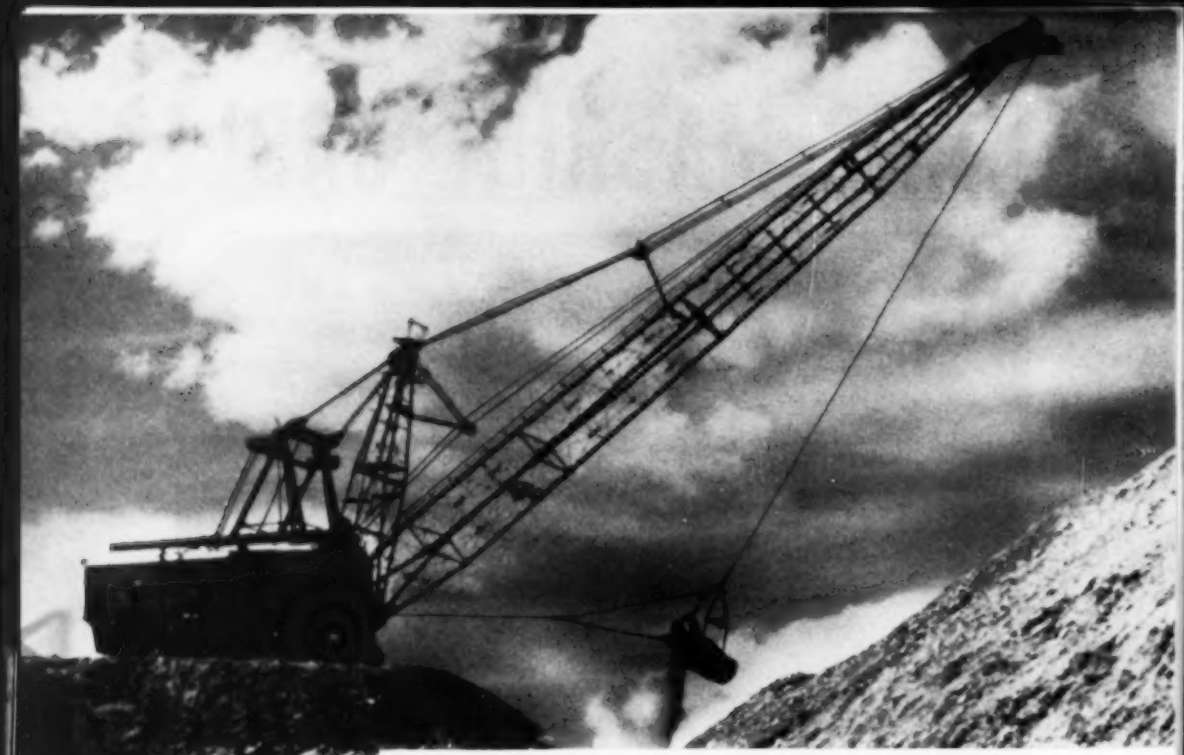
And, finally, the Roeprene jackets are "lead-mold" cured so that all components of the cables are held firmly in place. This special curing produces an extra tough outer covering, too, with top resistance to water, acids, alkalis and grease.

All Roebling Roeprene Mining Machine Cables are approved by the Pennsylvania Bureau of Mines Approval P-111, and comply with the requirements of the U.S. Bureau of Mines for flame-resistant mining cables.

Large quantities of Roebling electrical wires and cables are required in the defense program but we will do our best to meet your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 815 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. & 120 S. HEWITT ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH 1301 CLARK BLDG. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, NEW JERSEY



No Place for a Softy...

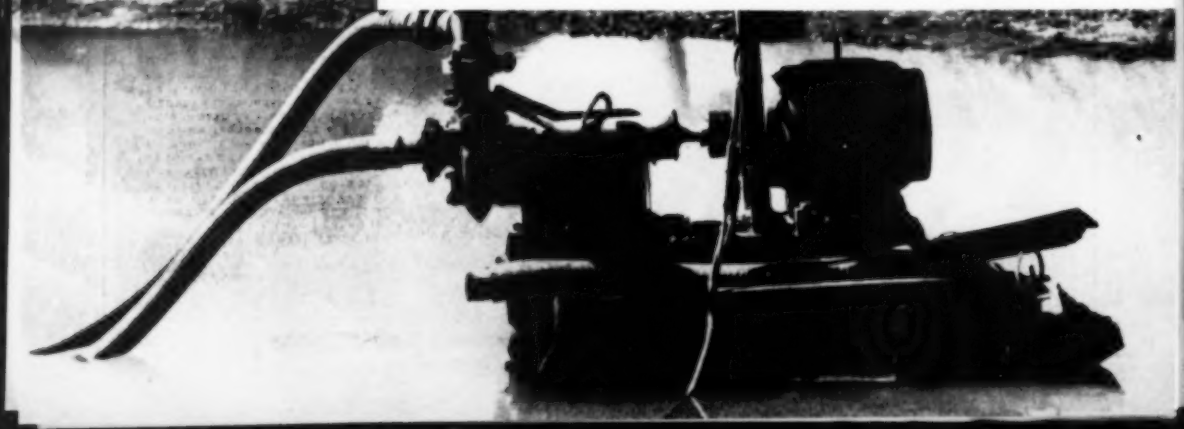
. . . which is exactly why Fairbanks-Morse Trash Pumps are used for de-watering service in this strip mine. Rough treatment, debris-filled water, pumping 50 feet vertically and hundreds of yards horizontally, being dragged by a tractor, or dropped into a pool by a dragline, are all in the day's work for these rugged pumps. Why not put them to work for you?

For the complete story, call your Fairbanks-Morse Pump dealer, Fairbanks-Morse Branch, or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE,

a name worth remembering

PUMPS • SCALES • ELECTRIC MOTORS
GENERATORS • LIGHT PLANTS • DIESEL,
DUAL FUEL AND GASOLINE ENGINES
MAGNETOS



GENERALS

go in—get the load—carry it out and over-the-highway

FASTER! EASIER! At Lower Cost!

Pile on the tons. The General L. C. M. is built to move heavy loads out over jagged surfaces without cuts, bruises or snags.

Move more tons over the road on this tough, dependable General H.C.T. Longer wearing, safer running, quicker stopping.

THE GENERAL L.C.M.

THE GENERAL H.C.T.

Make Every Worn Tire Work Longer for More Profit!

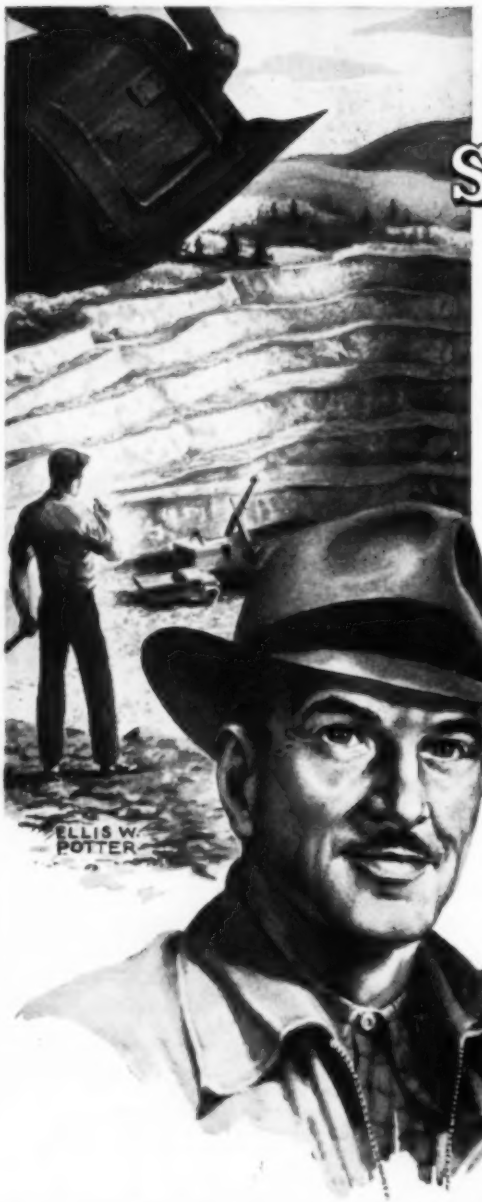
Your General Tire Dealer will KRAFT SYSTEM RECAP

Worn Tires with the New General Truck Tire Tread of Your Choice

KRAFT SYSTEM RECAPPING
A GENERAL TIRE SERVICE

You're throwing away money when you throw away worn tires or accept an ordinary "adjustment" for them. Let your General Tire Dealer—a tire expert—restore worn tires with famous factory controlled Kraft System Recapping. You choose from the complete line of on and off-the-road new General Tire treads and he'll put that tread on your worn tire. He can do sectional repairs too. Get Kraft System Recapping—get more profit from every tire.

SPECIFY GENERAL TIRES ON YOUR NEW EQUIPMENT



KEEPS SHOVELS WORKING

To shoot that heavy overburden down to handling size,

"Hook Up and Detonate with PRIMACORD"

When you use Primacord you get faster, easier loading. Positive firing of every cartridge in every hole means more work from your explosives. Planned shooting detonates the front holes a fraction of a second ahead of those behind, thus giving you relief from burden and better fragmentation.

There are other advantages, too. Primacord is light in weight — saving you time in making trunk line hook-ups and down-the-hole branches. And it's safe — can't be set off by stray currents, friction, sparks or ordinary shocks.

For better digging, use PRIMACORD regularly.

Ask your explosives supplier or write us direct for further facts

THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT
Also Safety Fuse since 1836

There's a type for every job. **PLAIN PRIMACORD** for shallow holes and surface trunk lines; **REINFORCED PRIMACORD** for deep holes and resistance to abrasion; **WIRE COUNTERED PRIMACORD** for deep, ragged holes; and **PLASTIC REINFORCED PRIMACORD** for deep holes and unusual wet conditions.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

NOVEMBER, 1952

IVAN A. GIVEN, EDITOR

No Serendipity

"NOW YOU SEE IT, now you don't" is perhaps the best description of the events following signing of the 1952 bituminous agreements. In the name of stabilization, WSB cut the wage increase and thus precipitated the unstabilization the agreements were designed to avoid. WSB can be admired for its effort to effectuate Congressional policy but can scarcely be credited with realism, especially since the Administration has talked the loudest and done the least in this field.

Another Roadblock

Perhaps one can only conclude that coal mining still is fated to doing things the hard way. Not only have operations, as in this instance, been disrupted by outside action but once again substantial wage increases have been posted in advance of the efficiency gains that would keep them from being translated into higher prices, throwing up another roadblock in the way of the coal salesman.

Short Term vs Long

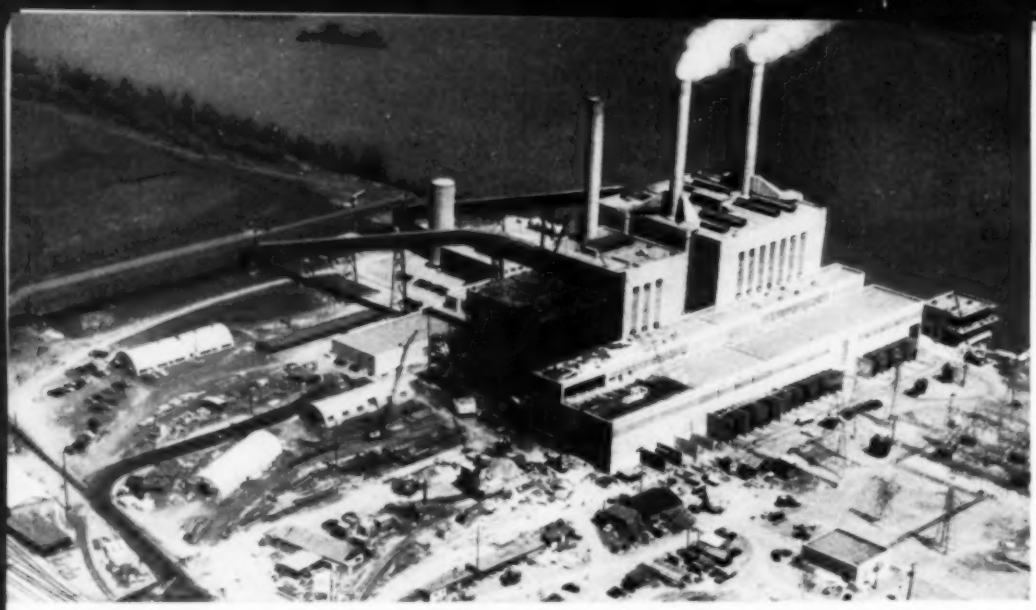
Basically, the fundamental factors in the fuel and energy picture favor coal, but at the moment continuing cost rises and unremitting competition are providing headaches. At the same time, there is no evidence that the hard core of efficient producers with quality coal and competent sales and service are going to experience overwhelming difficulties. This is not blind optimism, since Pollyannas have no place in an industry confronted with really tough competition and forced to deal with as militant a labor leader as John L. Lewis. Rather it is a firm conclusion based on the record, which shows that the bulk of the commercial tonnage today, as for many years past, is turned out by companies that have been able to live and grow through the toughest the past has been able to throw at them. The answer is not premium coal, favorable location or good natural conditions. Efficiency in all phases of operation has been the more potent factor.

Is Stabilization It?

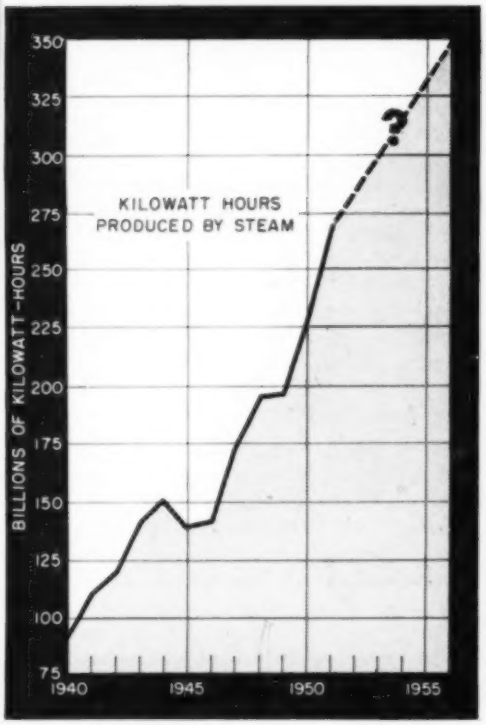
No one knows whether the next two or three years will be years of real stress and strain. However, even though there may be difficulties, it is hard to see anything approaching the depression eras of the past. The progress made by coal and the continuing high level of business and economic activity assure a basic demand that will rule out anything resembling the rough times of the past for the industry as a whole. But neither will things be as easy as in certain recent years, which in turn is reviving interest in stabilizing methods, with emphasis on an automatic return of cost if not a profit. *Coal Age* will analyze the possibilities in an early issue, but preliminary exploration indicates that the only plans that would be effective would require the industry to place its affairs in the hands of a government bureau with all its attendant hazards.

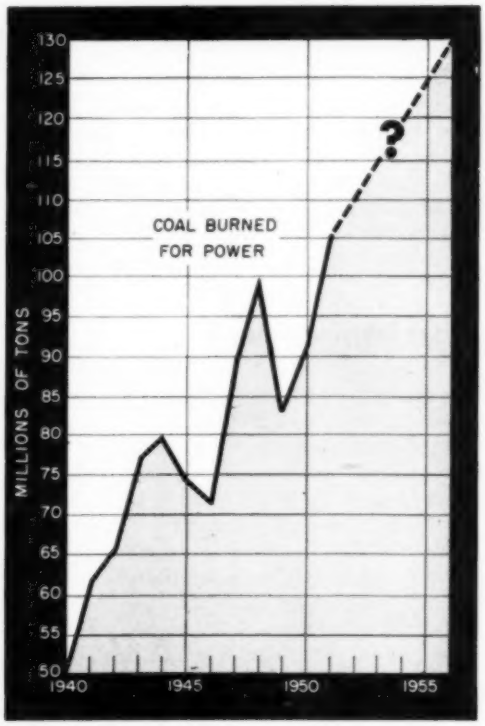
The Real Answer

Boiled down, serendipity is not for the coal-mining industry. Webster defines serendipity as "The gift of finding valuable or agreeable things not sought for." If nothing else, competition and John L. Lewis take care of that. But it might be more truthfully held that the values created by down-to-earth study of the problem and action accordingly—the real function of all levels of management—are the more-lasting values. Coal still has as great an opportunity in this respect as it ever had. Consequently, there is every reason to conclude that it can continue to go forward and prosper through efficiency, quality and service.



PP&L's Sunbury plant, still expanding, reflects the Nation's growing power needs and coal's fastest-growing market.





MORE POWER for America means . . . MORE COAL for electric utilities.

With utilities growing, more coal men will be . . .

Selling Coal for Power

Here are the facts, straight from a man who knows, on . . .

How a big power company buys its coal
How it selects one coal over another
How you can sell your coal for power-plant use

By C. H. FRICK
Manager, Coal Bureau
Pennsylvania Power & Light Co.
Allentown, Pa.

WHAT SWAYS AN ELECTRIC UTILITY in selecting one power-plant fuel over another?

What does a utility expect of its fuel suppliers?

How can a coal producer sell his coal to a utility?

Today, and in the years ahead, the answers to these questions may mean the difference between steady growth and bare-bones survival for a good-sized fraction of the coal industry. The reason is this: While other markets may sag—railroads, for instance—the electric-power industry is coal's fastest-growing friend. Except for steel, it's coal's biggest customer now. If it keeps growing—and it's sure to—it soon will outstrip steel. Whatever its rate of growth, it will have to find fuel for its boilers. The more boilers it operates, the more fuel it will need.

Large numbers of bituminous and some anthracite producers now are selling coal to utilities. There'll be a chance for more to break into the market as the electric industry grows. But it may be easier to break in than to stay in unless coal men understand the needs and wants of the utilities and resolve firmly to meet those needs and wants with the same service, quality and consideration that win and hold customers in other markets.

The following is a description of PP&L coal-procurement practices.

PP&L's home offices are at Allentown, Pa., and its power plants are either within or on the fringes of the anthracite-mining region of Pennsylvania. The company serves domestic, commercial and industrial customers, including a large majority of the anthracite mines.

The peak effective capacity of the 10 active steam stations is 685,500 kw. Largest plant in the system is the new plant near Sunbury, Pa.—now a 280,000-kw plant with a 125,000-kw addition now under construction, to be completed next year. In addition, construction of a new steam plant to be located on the Delaware River near Martins Creek, Pa., is underway. The first unit will be 132,500-kw capacity and is expected to be in service early in 1954. Smallest of the steam plants now operating is 14,000 kw. All steam plants in the system burn coal, either anthracite or bituminous, straight or mixed. Sizes of anthracite include Nos. 3, 4, and 5 Buckwheat and silt. The bituminous coal used is 1¼-in nut slack and high-volatile ⅜-in slack. Some 2,243,000 net tons per year is burned, of which approximately 2,049,000 tons is anthracite.

MR. FRICK—"Prime yardstick is cost per million Btu in steam produced."

HOW PP&L SELECTS ITS POWER PLANT FUEL

PRIME YARDSTICK in selecting fuel at PP&L plants is cost per million Btu in steam produced. On that basis, oil and natural gas are out of the running in the company's territory. In fact, oil pumped through a big pipeline running close by one plant in the PP&L system can't compete with coal on any foreseeable cost basis. Anthracite mines are close by, low-volatile bituminous coals from central Pennsylvania are within easy reach, and favorable freight rates put low-cost high-volatile bituminous coals from western Pennsylvania and northern West Virginia on a competitive footing with anthracite at some plants.

Cost per million Btu in steam, as pointed out, is PP&L's prime yardstick for buying fuel. Some utilities, in contrast, look to Btu's in the fuel itself. But PP&L, knowing that a given plant with given burning equipment will transfer a certain percentage of Btu's into steam, has fixed upon Btu's in the steam as its standard. For example, while an 11,000-Btu anthracite may make low-cost steam at Plant A, it may not make steam as cheaply at Plant B as a certain 10,000-Btu anthracite.

In short, PP&L buys the kind of coal—anthracite or bituminous, low- or high-volatile, low- or high-ash—that produces best dollar economy in a given plant. When the right coal for

Table I—Buying Coal With a "Horseshoe" Chart

How PP&L finds break-even price for other than "standard" anthracite at Sunbury.

Step 1—Enter fob price for "standard" anthracite at top of left column.

Step 2—Work down left column to find cost of Btu's in steam for "standard."

Step 3—Transfer "standard" steam-Btu cost to bottom of middle and right columns.

Step 4—To find break-even mine price for another anthracite or for bituminous, compute from bottom to top of middle or right column.

Step 5—To choose between anthracite and bituminous in a new plant, transfer top figure in right column to Table II below. Table II brings plant-investment cost into the computation.

	"Standard" Anthracite (Figure Down)	Other Anthracite (Figure Up)		Bituminous (Figure Up)
Cost per net ton				
FOB mine	$3.66	$3.55	←Break-even→	$2.69
Freight and tax	1.32	1.32	mine price	3.74
Delivered to plant	4.98	4.87		6.43
Handling cost	0.52	0.52		0.39
Delivered to boilers	5.50	5.39		6.82
Coal analyses				
Ash (standard, dry basis)	15%	15%		9%
Moisture	12.5%	12.5%		4%
Btu per pound:				
Moisture and ash free	14,900	14,600		15,000
Dry	12,665	12,410		13,650
As fired	11,080	10,860		13,100
Btu per ton (millions)	22.16	21.72		26.20
Operating results				
Boiler efficiency	82%	82%		86%
Btu in steam (millions)	18.17	17.81		22.53
Cost per million Btu in steam	30.27c	30.27c		30.27c

Table II—How Boiler-Investment Costs Influence Fuel Choice at Sunbury

PP&L actually pays this for a ton of bituminous	$4.20
though the operating break-even price is	2.69
	1.51
But against this difference of	
the minimum added investment cost of building a power plant to burn anthracite is	2.00
	0.49
This leaves a margin of favoring a large-size boiler for bituminous.	

that plant is found, the company fixes upon it as the "standard" coal for that plant.

PP&L then looks at other considerations that enter into fuel choice. These considerations are as follows:

1. Consistency of quality—A large modern steam plant is a complex structure of fuel feeders, furnaces, boiler tubes, valves and instruments, all tuned for precision and efficiency. If one element is off pitch, the whole complex goes out of tune. It's impossible to build a plant that will burn low-ash coal for a while, then high-ash coal, at the same efficiency. A plant operates at its best when fuel characteristics hold consistently at a fixed level.

2. Dependable supply, short-term and long-range—Having set a benchmark for a "standard" coal at a given plant, the utility must be sure that the selected coal is available and will keep on being available in adequate supply. The coal must keep coming to keep power flowing through the transmission lines for continuous-process manufacturing plants, mine pumps, hospital operating rooms and a thousand other essential needs. The coal industry has been plagued with lengthy strikes over a period of many years, and for this reason, PP&L maintains large stockpiles of coal, particularly at its larger or main plants.

3. Ease of handling—Flow characteristics of fine coal also are a consideration. Much of the coal that goes into a boiler plant has to be handled two or three times—from railroad car to storage pile or bunker and from bunker to furnace. Coal that becomes pasty clogs conveyors, feeder pipes and feeder tables and raises general havoc in maintaining steam.

4. Price—The price paid for coal has two aspects, immediate and long-term.

Immediate prices are easy to deal with. If two coals of the same characteristics and dependability cost different amounts when laid down at the power plant, PP&L naturally buys the coal that's cheaper. If their characteristics differ, PP&L makes some simple computations, as follows:

First, PP&L selects its "standard" coal for a given plant—the coal that provides lowest cost per million Btu's in steam in that plant. That cost figure, the result of computations that are shown in the left-hand column of Table I, is a matter of record in the company's Coal Bureau. Say the mine price for the "standard" coal is $3.66 a ton. With that as a starter, the figuring moves down the left-hand column, the various factors being applied in turn to give cost per million Btu in steam in the plant—say, 30.27¢—at the bottom of the column. This figure becomes the benchmark by which the company judges the merits and determines the ceiling price of any other than "standard" coal. Then the Coal Bureau starts with 30.27¢ at the bottom of the right-hand column and figures in reverse up the column until the mine price per ton emerges at the top of the column. Thus, to displace the "standard" coal, the proposed coal must not cost more at the mine than the figure at the top of the right-hand column. It's that simple. This same table also shows cost comparison between anthracite and bituminous.

But when prices are figured long-term, capital costs begin to creep into the computation (Table II). Say the company is considering building a new plant or adding new boilers and generating capacity to an old plant. Those projects require big capital.

For smaller boilers, in the 50,000- to 200,000-lb range, capital cost is about the same for anthracite as for bituminous firing. But today's practice among utilities is to install very large boilers, because the investment per unit of capacity decreases rapidly with increase in capacity of individual boilers. For a boiler plant above, say, 200,000 lb of steam per hour, a

More Power . . . More Coal

Nation Raises Power Goal

WASHINGTON, Aug. 28—National Production Authority today raised the Nation's power goal 10,000,000 kw. NPA aims to have 117,000,000 kw available by Dec. 31, 1956. The previous goal, set last March 22, was 107,000,000 kw. Only 75,000,000 kw was available Jan. 1, 1952.

The expansion will be in the big commercial utilities, which produce 95% of total electric power used by the public.

NPA hopes for an increase of 7,000,000 kw by the end of 1952, 10,000,000 kw in 1953, 12,000,000 kw more each in 1954 and 1955, and 1,000,000 kw more in 1956.

New England Plans More Power

BOSTON, Sept. 25—Sixteen New England utilities announced today a $3-billion growth program to quadruple the region's output and sales of electric power in the next 30 yr. The program already is partly under way.

The area's power capacity under the plan would be raised to 9,288,000 kw minimum and 12,421,000 kw maximum by 1975. Capacity in 1945 was 2,743,000 kw. The program includes steam and hydro installations from Maine to Connecticut.

New Power Plant for Ithaca

BINGHAMPTON, N. Y., Sept. 18—New York State Electric & Gas Corp. today announced plans for a new 500,000-kw steam-electric station near Ithaca, N. Y. The new station will be interconnected with the company's five other steam plants. Two years will be required to install the first 135,000-kw unit. This first unit will be the largest single generating unit in the company's system. A date soon will be fixed for start of construction.

Plan Power for Atom Plant

WASHINGTON, Aug. 12—Two coal-fired steam generating plants with total capacity of 2,200,000 kw will be built by a group of 15 utilities to provide power for the new $1,200,000,000 plant of the Atomic Energy Commission in Pike County, Ohio. It will take 4 yr to build the AEC installation. AEC's initial needs of 400,000 kw will be provided by existing facilities of the 15 cooperating companies. The new generating stations will go into operation as they are completed, beginning in 1954.

Sees Four-Fold Power Boost

CHICAGO, Sept. 10—By 1964 available electric power in the United States will have increased four times over what we had at the start of World War II, said A. A. Johnson, Westinghouse Electric Corp., at today's meeting of the Centennial of Engineering.

Mr. Johnson forecast an installed generating capacity of 160,000,000 kw by 1964, against today's figure of 80,000,000 kw. The increase is expected to run about 7% per year and no slowdown or saturation is in sight, he said.

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bituminous plant can be built at a lower cost than an anthracite plant for the simple reason that anthracite produces fewer pounds of steam per unit of furnace volume and per unit of heat-transfer area than bituminous coal. Thus two anthracite boilers usually are required to do the work of one bituminous boiler. That's a heavy cost factor.

There's another price consideration in addition to those cited above. It's this: The long-range outlook for anthracite fines in adequate supply for big power-plant needs is questionable. When supply does fall off, sometime in the future, prices will continue an increased but steep upward movement. The company must be in a position to produce the lowest-cost steam. Because large boilers designed to burn 100% anthracite require a much greater investment than large bituminous boilers and because of the uncertainty of future availability of large quantities of anthracite, the two newest boilers at the Sunbury plant were designed basically for bituminous, though they are capable of burning a mixture of anthracite and bituminous in varying proportions.

And that's why, when PP&L plans new boiler capacity these days, it studies carefully costs for fuel and construction for use of anthracite and costs for fuel and construction for use of bituminous.

WHAT A PP&L COAL CONTRACT SAYS

LIKE MOST ELECTRIC UTILITIES, PP&L has a standard printed contract for coal purchases and deliveries. It grew out of long experience and it aims at a fair deal for the utility and the coal producer.

The front side of the contract is mostly open space, with provision for specifying mine price, quantity, delivery schedule and mode and route of shipment and for detailing the facts about the contracting parties.

The reverse side of the contract contains the following:

1. Specifications—Standard coal normally will contain a given quantity of ash and a minimum quantity of moisture. It also must be of a certain size. These specifications vary from one plant to another, depending upon the design of the plant for which the coal is being bought. For a traveling-grate stoker burning anthracite, the ash content should not exceed 16%. For a pulverized-coal burner, like those at Sunbury, the ash in bituminous should not exceed 10%; anthracite, 20%. For the two mixed-fuel boilers at Sunbury, PP&L needs a high-volatile bituminous, because the higher the volatile content of the bituminous, the more anthracite can be burned.

2. Bonus-and-penalty clause—PP&L has pioneered with this clause in its coal contracts. The company's standard contract, as pointed out, fixes a definite range—say 13 to 15%—for ash content of anthracite delivered to a certain plant. All coal bought for that plant is expected to fall within that range. For each 0.5% of ash above the agreed-upon range, PP&L deducts 2% from the basic mine price to be paid. For each 0.5% of ash below the range, the coal producer earns a 2% bonus on his mine price. If a coal drifts outside the agreed-to ash range, the utility invokes the bonus-and-penalty clause and pays the coal producer accordingly.

PP&L samples all coal delivered to each plant and runs analyses in its own well-equipped laboratories. Reports of these analyses go to the producer, and PP&L adjusts his invoices accordingly. If a producer challenges the accuracy of PP&L's analysis, the utility sends samples of the coal in question to a commercial laboratory for check analysis. At least one big supplier of anthracite to PP&L samples and tests his own coal prior to shipment and periodically sends test reports to PP&L for comparison. Differences between the two tests always have been within the tolerance permitted by the A.S.T.M. testing code.

PP&L feels it has a good thing in its bonus-and-penalty clause. It's good for the utility and for the producer. It

These coal-burning utilities plan to grow . . .

Will They Be Your Customers?

	Coal Used in 1950 (Tons)	Planned New Capacity, 1951-54 (Kw)
NEW ENGLAND		
Connecticut Light & Power Co.	602,000	60,000
Hartford Electric Light Co.	142,000	66,000
Boston Edison Co.	215,000	81,000
United Illuminating Co.	205,000	30,000
Western Massachusetts Elec. Co.	190,000	46,000
Rockland Light & Power Co.	72,000	88,000
MIDDLE ATLANTIC		
American Gas & Electric Service Corp.	6,851,000	850,000
Consolidated Edison Co.	4,328,000	790,000
West Penn Electric Co.	3,862,000	557,000
Duquesne Light Co.	2,997,000	185,000
Niagara Mohawk Power Co.	2,816,000	520,000
Philadelphia Electric Co.	2,544,000	600,000
Pennsylvania Power & Light Co.	2,176,000	600,000
Pennsylvania Electric Co.	1,489,000	318,000
Public Service Electric & Gas Co.	1,046,000	415,000
New York State Electric & Gas Corp.	785,000	235,000
Scranton Electric Co.	621,000	44,000
Long Island Lighting Co.	502,000	300,000
Jersey Central Power & Light Co.	399,000	62,000
Rochester Gas & Electric Corp.	358,000	50,000
Jamestown Municipal Electric Dept.	78,000	20,000
EAST NORTH CENTRAL		
Commonwealth Edison Co.	8,592,000	450,000
Detroit Edison Co.	3,964,000	500,000
Ohio Edison Co.	3,078,000	482,000
Cleveland Elec. Illuminating Co.	2,311,000	120,000
Consumers Power Co.	2,137,000	411,000
Public Service Co. of Indiana	1,835,000	240,000
Wisconsin Electric Power Co.	1,634,000	240,000
Cincinnati Gas & Electric Co.	1,387,000	200,000
Indianapolis Power & Light Co.	936,000	100,000
Columbus & Southern Ohio Electric Co.	832,000	120,000
Central Illinois Public Service Co.	828,000	120,000
Toledo Edison Co.	773,000	60,000
Dayton Power & Light Co.	714,000	150,000
Wisconsin Public Service Corp.	384,000	60,000
Wisconsin Power & Light Co.	369,000	60,000
Southern Indiana Gas & Elec. Co.	332,000	20,000
Northern Indiana Public Service Co.	268,000	70,000
Lansing Board of Water & Electric Light	196,000	96,000
Central Illinois Elec. & Gas Co.	158,000	30,000
Lake Superior District Power Co.	88,000	20,000
WEST NORTH CENTRAL		
Union Electric Co. of Missouri	1,847,000	110,000
Northern States Power Co.	1,230,000	225,000
Kansas City Power & Light Co.	681,000	332,000
Iowa Electric Light & Power Co.	475,000	70,000
Iowa-Illinois Gas & Electric Co.	473,000	60,000
Black Hills Power & Light Co.	116,000	150,000
Iowa Public Service Co.	256,000	39,000
Interstate Power Co.	249,000	55,000
Minnesota Power & Light Co.	218,000	247,000
Nebraska Public Power System	77,000	30,000
Mississippi Valley Public Service Co.	57,000	15,000
SOUTH ATLANTIC		
Duke Power Co.	2,747,000	450,000
Virginia Electric & Power Co.	1,543,000	90,000
Potomac Electric Power Co.	1,206,000	25,000
Consolidated Gas, Electric Light & Power Co.	1,136,000	150,000
Georgia Power Co.	830,000	180,000
Carolina Power & Light Co.	516,000	52,000
Pennsylvania Water & Power Co.	198,000	66,000
Eastern Shore Public Service Co.	196,000	240,000
EAST SOUTH CENTRAL		
Alabama Power Co.	929,000	240,000
Louisville Gas & Electric Co.	767,000	60,000
Kentucky Utilities Co., Inc.	652,000	150,000
Tennessee Valley Authority	498,000	2,700,000
MOUNTAIN		
Public Service Co. of Colorado	207,000	68,000
Utah Power & Light Co.	93,000	120,000
Total	80,291,000	15,380,000

These Utilities, Like Many Others, Boosted Their Coal Use, 1951-52

	Coal Burned (Tons) 1951 (Actual)	1952 (Projected)
Hartford Electric Light Co.	301,000	375,000
Philadelphia Electric Co.	3,090,000	3,513,000
New York State Electric & Gas Corp.	1,017,000	1,182,000
Long Island Lighting Co.	387,000	518,000
Rochester Gas & Electric Corp.	569,000	621,000
Detroit Edison Co.	4,440,000	4,600,000
Ohio Edison Co.	3,581,000	3,960,000
Consumers Power Co.	2,281,000	2,450,000
Central Illinois Public Service Co.	867,000	890,000
Lansing Board of Water & Electric Light	314,000	325,000
Black Hills Power & Light Co.	131,000	150,000
Total	16,978,000	18,584,000

Source: *Keystone Coal Buyers Manual*, a *Coal Age* affiliate. Additional data may be obtained upon request to Keystone Coal Buyers Manual, 330 W. 42 St., New York 36, N. Y.

assures that a given boiler will consistently get the kind of coal that best suits it and that the utility will get what it pays for in the coal.

For the coal producer, the bonus-and-penalty clause provides a target to shoot at, gives him reasonable leeway, offers a bonus to offset the added costs of additional cleaning and provides a square deal if his coal doesn't measure up to specifications. With the penalty terms clearly understood from the outset, the producer knows what to expect if he falls short of expectations. That way, he and his utility customer deal with each other on a factual, rational basis—the only true basis for good buyer-seller relations. Besides, the coal producer isn't annoyed by having to sell rejected coal on a spot or distress market—he simply pays the penalty for shipping inferior coal. Of course, if the producer fails consistently to meet specifications, he runs the risk of contract cancellation.

3. Cancellation clause—The utility reserves the right to cancel a coal contract for good reason—a plant shutdown, a disaster that wrecks a plant, a decline in fuel needs (in some utility systems, but not to any great extent in PP&L, a rainy season brings in more hydro power and therefore cuts fuel needs) or persistent failure of the coal producer to meet specifications.

4. Renegotiation clause—PP&L knows that a wage drive by the mineworkers' union usually brings an increase in the coal producer's cost and that this cost, or much of it, must be passed along to the coal buyer. Some utilities provide an escalator clause, which moves the price up proportionately with the added cost of mining coal. PP&L includes a renegotiation date in its coal contracts. Formerly, it was a fixed annual date, inherited from the years when the mineworkers and producers negotiated new contracts on or about April 1. In recent years, with coal-wage agreements being negotiated at odd seasons, PP&L has treated the renegotiation date informally, adjusting it to the needs of the coal producers.

HOW TO SELL COAL TO A UTILITY

THERE'S NOTHING COMPLEX about selling coal to a utility. Mostly, it's as simple as ABC. Here, however, are the steps that PP&L men suggest for a coal producer seeking utility customers:

1. Find out what plants you want to sell to.

That means keeping on top of the news—news about power plants being built in your market area, additions to existing plants, modifications of existing plants that will require a different kind of coal, and withdrawal of a coal supplier who has been providing coal for a certain plant. Sources of this kind of news are the usual ones: namely, curb-stone conversations, power-plant directories, business and industrial magazines (especially those covering the power and fuel fields) and your state, local and regional newspapers. Your salesmen also can keep you posted on new leads.

2. Study your target plants.

That means finding out how much tonnage will be needed, what kind of coal will be burned and what advantages possible competitors may have over you. The tonnage needed will give you an idea about whether you can sell enough coal to justify the changes required in your mining operations and your preparation plant. Don't overlook the difference in freight rates from your mine and your competitor's mine. After all, the utility has to add freight to price. If you see a chance for a big-tonnage contract, you may be able to adjust your price to put you on an even footing with a coal company that enjoys a lower freight rate than yours.

One other thing you should keep in mind: What can you offer besides price that will induce a utility to buy your coal? Maybe it's engineering, maybe it's dependability, maybe it's something else. Whatever it is, be forehanded with it—be prepared to throw it into the scales when you make your sales pitch.

3. Study your own coal and your ability to produce what's needed.

To sell your product, you must know what it will do and what its characteristics are—ash, moisture, sulphur, grindability, volatile matter, coking qualities, ease of handling and other traits that will be revealed in laboratory tests. Having found out those facts, make a cost-and-engineering study to find out how those characteristics measure up to the needs of the power company and whether you can economically adapt your coal to the specifications.

Somewhere in your calculations on preparation there may be a line marking the place where you'll start to lose money. In other words, it's possible to over-prepare utility coal. For instance, you could build a cleaning plant that would bring ash down to 7%. The higher price for this coal might not justify its use compared to, say, 9%-ash coal. Thus the money you might spend to bring ash down five percentage points might hurt you more than it would help you.

4. Make an appointment with the utility's coal buyer. Tell him the facts about your coal, your company and your services.

5. Suggest a trial order.

When you suggest a trial order, be prepared to accept a price that's somewhat lower than the price you quote for regular deliveries. Putting a trial order through a power plant adds a good deal to a utility's costs—special handling on the siding and in the bunkers, special temporary adjustments in feeding and firing and extra instrument-watching and record-keeping. The power company also must make special laboratory tests.

A trial order probably will be from five carloads upward, depending upon the size of the plant concerned. The coal you deliver for trial should be exactly what you expect to deliver on a regular basis. Upgrading your trial order above normal would only lead to disappointments for you and the utility in the long run.

6. Expect to be investigated.

Since a public utility's records are in the public domain and subject to inspection upon demand, and since a utility operates in the public interest, it must have assurances that the companies it deals with are financially sound, and dependable as a source of supply. Before signing a contract with you, a utility may inquire about you and your company in several quarters—particularly your other customers and your suppliers.

WHAT A UTILITY ASKS OF ITS COAL SUPPLIER

FROM A UTILITY'S STANDPOINT, the following traits will tip the scales in favor of one coal producer over another and will ensure a long and mutually profitable relationship between buyer and seller.

1. Stable price—that is, price that is steady and rational, not subject to the ups and downs of alternating short supply and distress sales.

2. Knowledge of product.

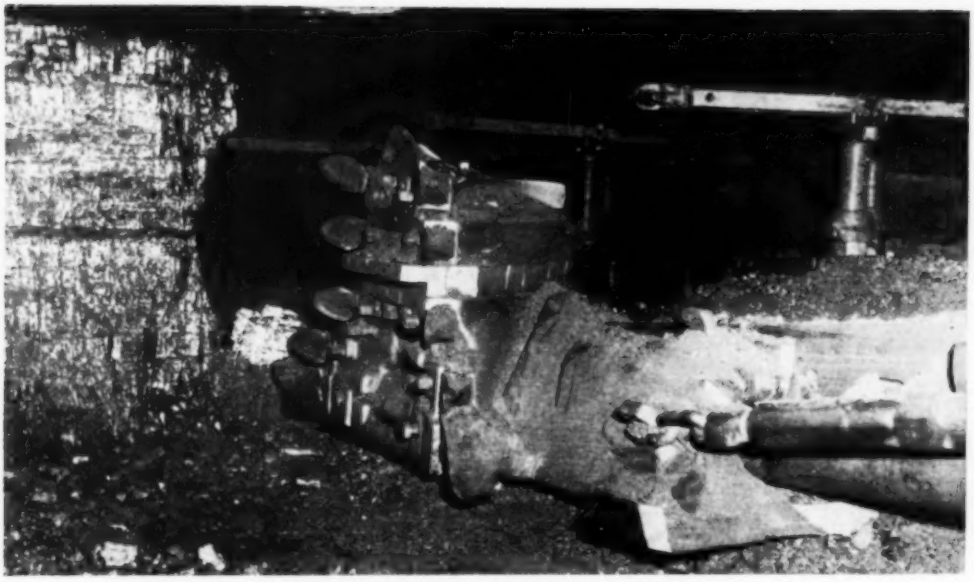
3. Salesmen and brokers who know and can tell effectively what their coal will do and who are tactful and pleasant to deal with.

4. Consistent fulfillment of specifications.

5. Dependable capacity that measures up to the utility's needs at all times.

6. Honesty in all dealings.

An electric-power utility expects no more of its coal supplier than is usually expected in a seller-buyer relationship. Friendly relations between a coal producer and his utility customer are founded upon mutual respect and mutual benefits.



CUTTING BACK AND FORTH across a 328-ft face in a 34-in seam, this planer has . . .

Modified Longwalling in the U. S.

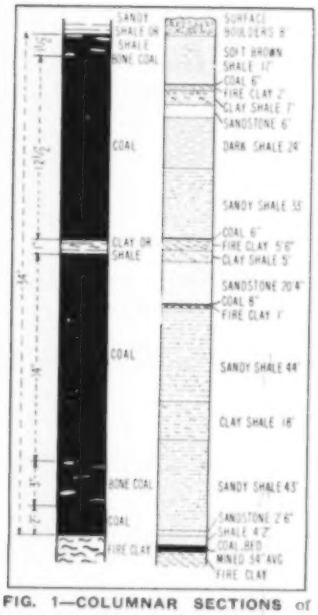


FIG. 1—COLUMNAR SECTIONS of seam and cover typify conditions in experimental area.

In first American trial, German coal planer successfully increases percentage recovery and productivity in retreating a 328-ft-wide face in the Pocahontas No. 4 seam in southern West Virginia.

BASED UPON EXPERIENCE at Stotesbury No. 11 mine, Eastern Gas & Fuel Associates, Helen, W. Va., the Loebbe Hobel coal planer emerges as an added starter among the machines designed to promote higher recovery and higher productivity as the industry turns to thinner seams to fill our present and future needs for high-quality coals.

Operating on a modified longwall system in the Pocahontas No. 4 seam, the planer in its first trial section has shown an increase in recovery and more tons per man shift, as compared with previous methods. Promoters of the project agree that initial results are encouraging and that further refinement of methods and section layout and continued training of the crew will provide bigger benefits.

The planer experiment was a cooperative venture among EGFA, the U. S. Bureau of Mines and Mining Progress, Inc., Highland Mills, N. Y., American agents for Gewerkschaft Eisenhuette Westfalia, the German manufacturers of the unit. In getting the work started, L. C. Campbell, vice president, EGFA, acted for his company, the late A. L. Toenges, principal mining engineer, fuels and explosive branch, represented the Bureau, and A. J. Schneider-Paas, president, Mining Progress, Inc., represented the manufacturers. In the later phases, L. A. Turnbull, of the Washington office, acted for the Bureau, with assistance from J. J. Dowd, senior mining engineer and W. A. Haley, mining engineer, fuels and explosives branch.

HOW THE PLANER PERFORMS

As shown in the accompanying vertical sections (Fig. 1), the Pocahontas No. 4 seam averages about 34 in in thickness in the area chosen for the

PRODUCED up to 800 tons per shift with a crew of about 38 men.

With a Coal Planer

trials, and carries a clay parting near the center and bone-coal layers near the top and bottom. The cover which varies from 100 to 300 ft in depth consists of interbedded sandstone, shale and shaly sandstone. The coal is friable and the seam is practically flat, with only gentle local rolls.

The first planer section (Fig. 2) was opened by two sets of three headings each which defined a block of coal 328 ft wide and 1,741 ft long. Subsequent panels, adjacent to the first, will require only one set of three headings for development, since the inby headings from the preceding panel may be utilized. Two rooms at the inby end of the panel were driven between the inside headings to provide a starting place for planer operations, the set-up room adjacent to the block being 30 ft wide to accommodate the equipment. When the planer had retreated the block about 16 ft toward the mains with no immediate roof break, the roof was blasted to start caving, and no further blasting was necessary to get complete roof caving.

As in conventional mining at Stotesbury No. 11, a 290-ft-wide barrier pillar was left at the end of the block to support the mains.

So much for the characteristics of the coal and section layout. Here are some data to show what the planer did in the first panel:

Width of planer face, ft	328
Length of block, ft	1,441
Area of block mined, acres	10.85
Average thickness of seam, in	34
Clean coal recovered from raw coal, per cent	95
Average retreat of face per shift, ft	15.5
Number of single shifts operated	93
Number of man-shifts to mine block	3,004
Number of man-shifts to develop panel	2,537
Total shifts for development and mining	5,541

Development of the panel, which required 2,537 man-shifts includes moving to the next panel and setting up the equipment for mining and next block. Continuing with performance data, here are some figures on production:

	Raw Coal, tons	Clean Coal, tons
Production for panel	54,158	51,450
Average production per shift (93 shifts)	582	533
Average peak production for 15 consecutive days	731	694
Maximum production for one shift	842	800
Average production per man-shift (93 shifts)	18.0	17.1
Average production per man-shift for 15 consecutive days at peak production	19.4	18.4
Production from development of one side and inby end of experimental section	17,667	16,784
Total production from development of panel and mining of block	71,825	68,234
Average production per man-shift for development panel and mining block	13.0	12.3
Average production per man-shift for development and mining by conventional methods at mine	10.9	10.4

In this tabulation, the raw-coal tonnage in the block is an estimated quantity; the average production per shift includes coal mined during the training period, and the comparative tons-per-man-shift figures for planer and conventional mining do not include a third-shift moving crew.

Concerning percentage recovery, planer mining showed 83.3%, against 78.1% for conventional mining at Stotesbury. In conventional methods, room panels are 575 ft wide, rooms are 50 ft wide on 60-ft centers and are holed into each other without leaving a barrier pillar between the room ends. Furthermore, the chain pillars in the entries which opened the planer panel were for safety reasons

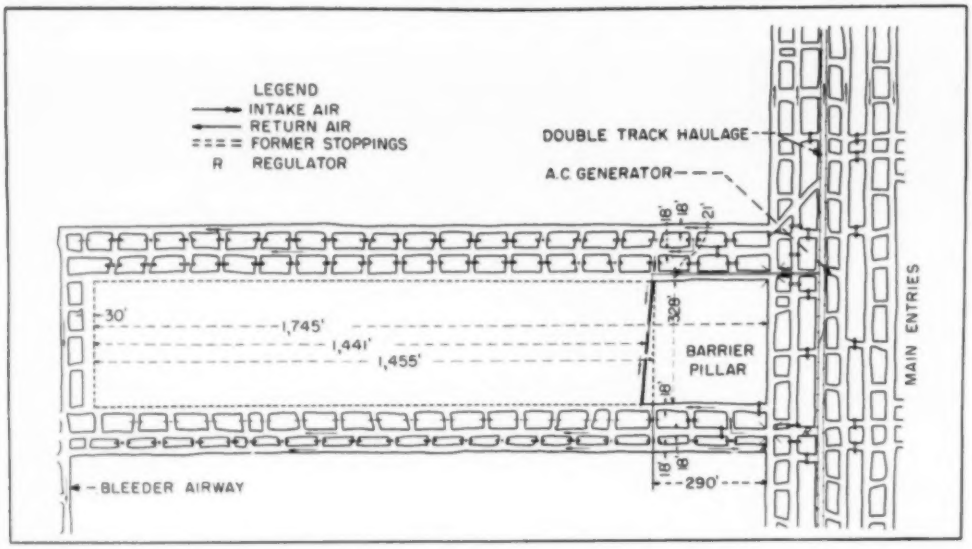
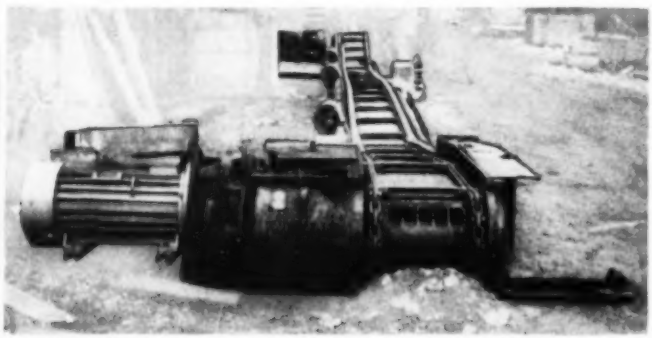


FIG. 2—BLOCK OF SOLID COAL, 328x1,441 ft, is completely extracted in 93 planer shifts.



SURFACE VIEW shows assembly of planer, conveyor and drive unit. The planer operates at 75 fpm and the conveyor at 150 fpm.

left larger than those in conventional mining. Further experience with the planer may show that the face can be widened and the chain pillars safely reduced, thus further increasing recovery. In computing recovery in planer mining, three development headings, the two opening rooms and the block are included. In conventional mining, three headings and the rooms in a panel are included.

HOW THE PLANER IS OPERATED

As shown in the accompanying photos, the major units of face equipment are (1) the planing head which is hauled back and forth across the face, slicing a 3½-in-deep cut off the solid with each pass and (2) a double-chain and flight conveyor for transporting the coal from the cutting edge of the planer to the entry. The planer head operates at a speed of 75 fpm in either direction, while the conveyor operates at 150 fpm in one direction only. At Stotesbury, the face conveyor discharges to a Jeffrey chain conveyor in the entry, the chain conveyor to a belt conveyor, also in the entry, and the belt conveyor discharges to mine cars in the mains.

The height of cut for this 34-in seam is 25½ in. As shown in the photo, a spacer block is inserted at a height which keeps the cutting bits out of the shale or clay parting near the center of the seam. The head is hauled back and forth across the face by a chain with a 50-ton breaking strength, although the actual load on the chain is limited to about 20 tons by shear pins on the drive shaft. The endless chain is attached to each side of the planer head with turnbuckles and passes around driven sprockets on the drive units at each end of the conveyor. These units are powered by 50-hp motors. The planer travels along a 4-in guide tube through which the return side of the chain is carried. The bottom knives are carefully adjusted to keep the planer in the coal and are replaced after about 10 shifts.

The conveyor is made up of sections about 59 in long (1½ meters), with a 5-deg flex angle between sections to compensate for unevenness of the mine floor and coal face. Compressed-air lines and power lines for the conveyor-mounted face lamps and tail-end drive are attached along the gob side of the conveyor in conduit which is protected by the spill plate.

Both the main drive at the head end of the conveyor and the auxiliary drive at the tail end include 40-kw AC motors, reducers and sprockets for driving the conveyor and planer, a compressed-air-operated clutch for the planer drive sprockets and a ratchet-type shifter for advancing the drive unit in the direction of mining as the remainder of the conveyor is moved by pneumatic shifters.

Operating controls are installed only at the main drive, and the operator's station is equipped with a signal lamp which can be flashed through buttons at the face lamps along the conveyor (20 ft apart) to signal the operator.

The pneumatic shifters, also 20 ft apart, consist of a piston and cylinder which work against the foot of an inclined steel jack to keep the conveyor tight against the face. Compressed air at from 60 to 70 psi to power the shifters is supplied by an auxiliary portable compressor through airlines

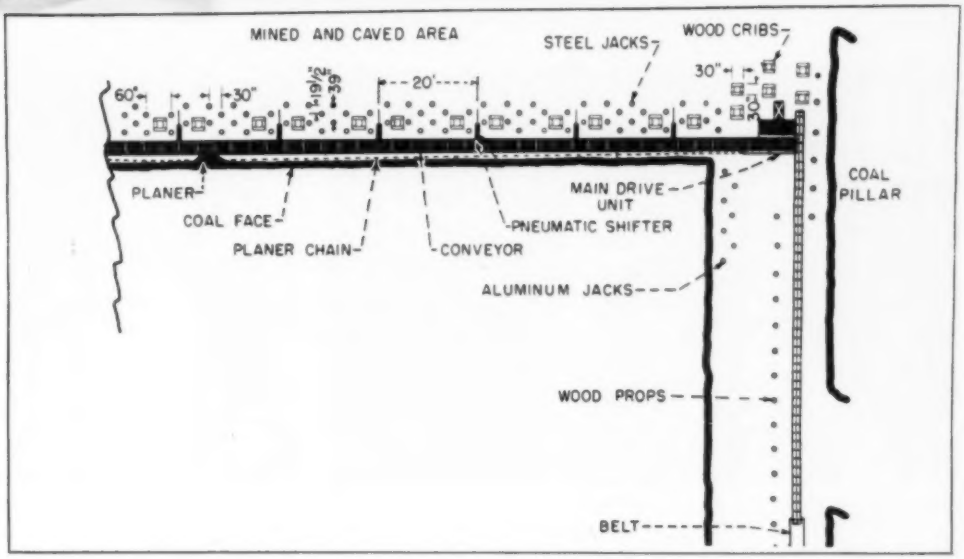


FIG. 3—ROOF-SUPPORT and equipment utilization are major factors contributing to effective planer mining.

attached to the conveyor. Maximum stroke of the shifters is 32 in, but the effective stroke is about 26 in. When this length of advance has been made, a valve is turned at the shifter to release the air and retract the piston, thus drawing the steel jack forward. The top of the jack then is reset against the roof, the air is turned on and the shifter is set for another 26-in advance.

HOW THE ROOF IS SUPPORTED

Roof support materials include Uerdinger steel jacks and headers and timber cribs installed as shown in Fig. 3. All are recovered and moved back as the face retreats. The steel jacks are 60 in apart in rows parallel to the face and 39 in apart perpendicular to the face, but the rows are staggered, as shown, to provide adequate protection. Steel I-beam caps, 39 in long, are supported by each row of jacks perpendicular to the face, providing continuous support from the gob line to the face. Furthermore, these steel caps are cantilevered over the conveyor from the row of jacks nearest the face to protect the conveyor and immediate face area from small falls. The steel caps are 2¾ in high and 2½ in wide and are designed to permit their end-to-end connection for continuous support.

Fully retracted, the jacks are 25½ in high, and fully extended, 34 in high. This 8½-in extension includes 7¾ in on the thread barrel and ¾ in in the seating wedge. The jacks will yield 2½ in under a load of 40 metric tons (about 44 short tons) and fully yielded will hold about 90 metric tons before failure. The yield is mechanically accomplished through the elastic properties of four compression rings in the base of the jack. Heavy loads may distort the deformation tube in the cylindrical base under the force of the rings, but removing the tube, turning it end-for-end and replacing it returns the jack to its original specifications. The cycle can be repeated time after time as long as the jack has not been overloaded. The 4-in base plate upon which the jack rests is removable to permit the tube to be turned.

In discussing the project, Mr. Dowd cautioned that wherever possible longwalling should proceed up the pitch to permit water to drain into the gob away from the jacks. Where the bottom was dry, the bases of the row of jacks along the gob sunk into the clay from 3 to 4 in under normal conditions. But in local dips where water gathered in the face area during idle periods the jacks along the gob sometimes sunk up to 12 in into the bottom, thus making recovery difficult.

The body of the jack is equipped with a latch to open or close the chuck around the thread barrel. In setting a jack, the latch is lifted to open the chuck, the thread barrel is raised to seat the jack and cap against the roof, then the latch is forced downward to lock the jack in the extended position. Final tightening is done by striking the wedge at the top of the jack.

In recovery, the latch is raised to free the thread barrel from the chuck, permitting the jack to collapse.

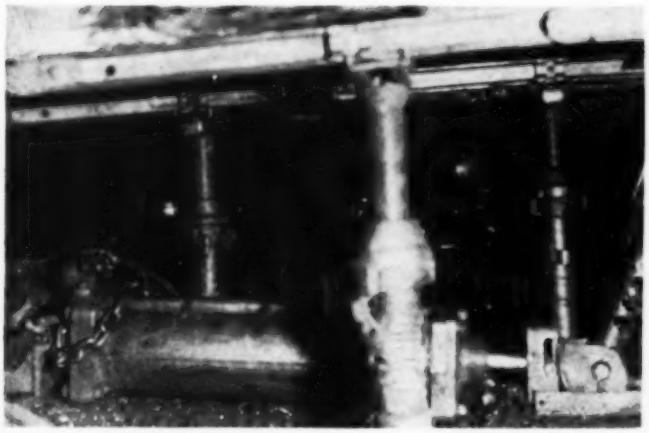
As the experiment proceeded, a single row of wood cribs was placed from 8 to 12 ft apart, each replacing a row of steel props perpendicular to the face. Cribs were set on mounds of fine coal and were dismantled and reset after mining had progressed 6 to 8 feet. These gave a marked improvement in roof control, bottom conditions and planer operation, and have been adopted as standard procedure.

The roof in the belt entry is bolted, with bolts on 4-ft centers. Timber cribs are used inby the main and auxiliary drive units and jacks and wood props are used in the entries outby the drives. The belt entry is bottom-brushed to provide 50 in of height along the side where the belt is installed.

WHAT THE CREW DOES

Productive time at the face is about 6¼ hr per shift, the remaining 1¾ hr being consumed in travel time, lunch time, instruction and safety discussions. Coal is produced on the first shift only and service is performed on the second shift. Three German instructors spent full time with the first shift in addition to two section foremen. Therefore, in charging shifts against the operation, only three supervisors are considered, since the foremen assume the instruction duties after their initial indoctrination into planer mining. However, another German instructor led the second shift servicemen and his shifts are included. The time of a third-shift moving crew is not included because their duties also are required in regular mining.

Three of every four men in the



PNEUMATIC SHIFTERS (left photo), force conveyor close to the face and move it up as the face retreats. Steel jacks (right), with a 2½-in yield under a pressure of 40 metric tons, support roof in the face area.

crew are engaged in roof-support duties, and here is a classification of duties and time log of the crew throughout the mining of the first panel:

Classification	Shifts Worked 1st	2nd	Total
Foremen	156	8	164
Operators	93		93
Loaders (cleanup)	173		173
Jack setters	1,491	131	1,622
Jack robbers	278		278
Headpiece cleaners	138		138
Tailpiece cleaners	93		93
Boom men	93		93
Belt men	101		101
Rock dusters		90	90
Rock drillers		44	44
Slate men		14	14
Timbermen		8	8
German instructor		93	93
Total	2,616	388	3,004

During the peak production period of 15 consecutive days, when average output was 694 tons per shift, clean coal, the regularly assigned crew averaged as follows:

First shift:

Foremen	2.0
Operator	1.0
Crib men	1.7
Jack setters	19.3
Jack robbers	4.0
Headpiece cleaners	2.0
Tailpiece cleaners	1.0
Boom man	1.0
Belt-cleanup men	1.3
Total, first shift	33.3

Second shift:

Lubrication, maintenance, supplies	4.0
Miscellaneous	0.5
Total, second shift	4.5
Total, both shifts	37.8

The foremen supervise the operation, sharing the responsibility along definite zones of the longwall.

The operator never leaves the control station at the main drive. He operates the planer and conveyor in close conformance with prearranged signals from along the face.

The crib men work in assigned sections along the face, setting and recovering the timber cribs. They also help in cleaning up spillage and in breaking off occasional tight top coal with pneumatic picks after the planer has passed.

The jack setters work in pairs in assigned sections along the face, setting jacks along the gob side of the conveyor and assisting the crib men.

The jack robbers work singly in assigned sections, recovering jacks from the gob line and passing the jacks and steel caps to the jack setters.

The headpiece cleaners load spillage around the main drive, set and remove cribs in the heading, operate the ratchet shifter in moving the drive unit and otherwise assist the operator.

The tailpiece cleaner performs similar duties at the tail-end drive.

The boom man loads mine cars in the mains and operates the belt.

The belt cleaners load spillage along the belt and chain conveyor.

On the second shift, from 3 to 5 men perform general service work, such as lubricating the equipment, placing supplies, shortening the chain conveyor and setting roof supports if this work lagged during the first shift.

PROVIDING AUXILIARY SERVICES

Power for the drive units and lights is supplied as 500 v, 50 cycles, AC, from a 350-kva generator in the main entries which is driven by a 200-hp motor. The motor is connected to the 2,300-v, 60-cycle mine power circuit. The 50-cycle components are the original equipment as supplied by the German manufacturer. A main control panel between the planer and generator is fitted with starters for the drives, a lighting transformer, a main power switch and circuit breakers. The planer is connected to this panel through 350 ft of cable, and the control panel, installed in the belt entry, is relocated as the block of coal is retreated.

With regard to ventilation, a total of about 22,000 cfm enters the panel, of which from 10,000 to 12,000 cfm sweeps the working face and leaves through a bleeder.

Delays resulting from mechanical breakdowns of the planer were negligible, although delays were caused by shortages of empty cars, power interruptions, roof-control problems, compressor difficulties and adjustments to keep the planer in the coal.

Engineering services were in charge of Stephen Krickovic, chief engineer, Eastern Gas & Fuel Associates. Close operating supervision, which substantially contributed to the success of the venture, was the responsibility of John Harper, general manager; H. A. Quenon, division manager; W. D. Hawley, division superintendent. In direct charge of the project at the mine were J. H. Benedict, mine superintendent, and Fred Hill, mine foreman. Arno Schneider-Paas, Werner Georg, Karl Marquardt and Georg Leupold, mechanical engineers, Mining Progress, Inc., provided technical advice concerning the equipment.

The cooperation of the Bureau of Mines in supplying photos and data for this article is gratefully acknowledged.

6,211 Miners Speak on Safety

Upon organization of the safety department of District 1, UMWA, in January, 1949, the authors, Mr. Kaczinski and Mr. Kosik, then district president, decided that the best way to set up a goal for their efforts was to poll by questionnaires face workers in the district to learn their opinions on safety.

Their answers indicate that safety may be further increased by:

1. **Following established procedures for providing face supplies.**
2. **More diligent inspection by bosses during their daily visits.**

Not "condemning with faint praise," the men credit management for:

1. **Providing daily inspections of working places.**
2. **Requiring good suggestions from bosses on how to eliminate hazards.**

By CHARLES KACZINSKI, Safety Director,
District I, UMWA, Wilkes-Barre, Pa.; and
MICHAEL J. KOSIK, Secretary,
Anthracite Board of Conciliation, Hazleton, Pa.

ONE OF THE MAJOR ACTIVITIES in the early days of the Mine Safety Department of District 1 was to make a thorough and exhaustive study of coal-mine injuries. This brought to light the need of a broad program with the initial objective of training all District 1 members in accident-prevention measures. Such training subsequently was conducted by federal mine inspectors under the direction of E. H. McCleary, district engineer, U. S. Bureau of Mines, Wilkes-Barre, Pa. Up to Aug. 1, 1952, a total of 14,849 men (49.5% of district membership) had completed the Bureau's 20-hr course in coal-mine accident-prevention.

The district officials felt that to assure a sound basis for future safety activities, more first-hand information regarding working conditions and practices would be required. They were confident that such information could be obtained by enlisting the cooperation and advice of the membership.

Heretofore, opinions regarding the causes of mine accidents and suggestions for their prevention have been expressed principally by company officials and state and federal inspectors. These opinions have been based upon personal observation and in some instances the deductions have not been alike.

It is our belief that if the mineworkers were given an opportunity to express their individual opinions, based upon their personal experience, some new angles with respect to the causes and prevention of accidents might be revealed. Also, each mineworker would come to realize that he plays an important part, at least in the operation of the district's safety program.

How the Men Were Polled

After consultation with state and federal agencies, company officials and the safety department of the international union, a questionnaire was made up to obtain the personal views of the mineworkers. The questionnaire was mailed Feb. 10, 1951, to the homes of 19,714 miners and miners' laborers in District 1, the survey being confined to face workers only. To encourage freedom of thought and to be certain of getting frank opinions, the men were instructed not to sign their names to the questionnaires.

Adapted from a paper presented Oct. 20, 1952, at the 40th National Safety Congress, Chicago, Ill.

Of the 19,714 questionnaires sent out, 6,211 (32%) showing some or all questions answered were returned for processing and 323 (2%) were returned by the Post Office as a result of improper addresses. The sealed envelopes containing the marked questionnaires were opened at the Scranton, Pa., offices of the International Business Machines Corp. in the presence of representatives of the Pennsylvania Department of Mines, the Bureau of Mines, anthracite operators and UMWA. Tabulating the information was a job for IBM personnel at their office.

The 6,211 completed questionnaires came from men employed at 102 mines operated by 41 coal companies, large and small. Inasmuch as Questions 1-21, inclusive, were designed for the use of the district office and did not concern mine safety, they will not be discussed. However, Questions 22-41, inclusive, did pertain to safety. The information revealed in the answers to these questions and the comments of the authors follow:

What the Survey Reveals

22. Do you at any time experience a shortage of:

	Yes	
(a) Brattice?	1,206	20%
(b) Cappieces?	1,262	20%
(c) Lagging?	914	15%
(d) Props?	1,490	24%
(e) Timber?	1,012	16%

23. How often do you experience such shortages?

(a) Always	946	15%
(b) Sometimes	4,628	75%
(c) Never	1,891	30%

Inasmuch as the total replies add up to 7,465 instead of 6,211, it is obvious that some men inserted a check mark after more than one answer. It also is obvious that a miner cannot be expected to fully protect himself from falls of roof and rib unless he has an adequate supply of materials with which to maintain a safe working place.

24. Does the boss permit you to work in your place when you are short of:

	Yes	
(a) Brattice?	863	14%
(b) Lagging?	397	6%
(c) Props?	874	14%
(d) Timber?	578	9%

Of the 6,211 questionnaires submitted, 4,522 carried no answer to this question, and three men claimed that they were not permitted to continue working if any of these supplies were not available. The fact that men continue to work, either of their own volition or on instructions of the boss, in places where roof supports are

needed but unavailable undoubtedly accounts for some roof-fall accidents. There is only one sensible thing to do in the event supplies are not available to keep a working place safe; that is, get out of the place promptly and stay out until supplies are available.

25. Is your working place examined by a company official before you start your shift:

	Yes	
(a) Every day?	5,664	91%
(b) Some days?	279	4%
(c) Never?	131	2%

Only 93 of the 6,211 returns failed to show an answer to this one. Since some of the returns were submitted by men employed in non-gassy mines, where pre-shift examinations are not required by state law, the large proportion of affirmative replies speaks well for management.

26. Is the company official certified as a:

	Yes	
(a) Mine foreman?	2,311	37%
(b) Assistant mine foreman?	3,785	61%

At first glance, it appears that the answers must be incorrect, since most states require all supervisors to be certified before they can act as mine foremen or assistants. However, a review of Article VIII, Section 1, of the Anthracite Mining Laws of Pennsylvania reveals that:

"It shall not be lawful, neither shall it be permitted, for any person or persons to act as mine foreman or assistant mine foreman of any coal mine or colliery unless they are registered as a holder of a certificate of qualification or service under this act, or unless, in the judgment of the employer, he is a person possessed of qualifications which make him equally competent to act in such position."

The responses to Question 26 imply that only 37% of those persons employed as mine foremen possess mine foremen's certificates issued by the state and that only 61% of the assistant foremen are so certified. It is unfortunate that all miners cannot have the feeling that their health and safety are in the hands of bosses who have demonstrated their qualifications for such responsible positions by passing the rigid examination required by state law before certificates are issued.

27. Does the person making the examination leave his initials and the date at or near the face?

(a) Yes	5,871	95%
(b) No	157	2%
(c) No answer	183	3%

The only evidence of a pre-shift examination, as far as the miner is concerned, is generally the visible record left by the examiner near the working face. Such evidence was used by the miners in answering Question 25, and the similarity of the replies to Questions 25 and 27 seems to prove the accuracy of the data with respect to pre-shift examinations.

28. Before starting to work, do you report to the boss who examined your working place?

(a) Yes	5,538	89%
(b) No	343	6%
(c) Sometimes	174	3%
(d) No answer	156	2%

Miners who have not been reporting to the pre-shift examiner should "mend their ways." The boss making the examination usually has a good idea of conditions in the places he inspects. He should be given the opportunity to tell what he has found. Being forewarned in these instances is really being forearmed.

29. Does the boss who examined your place prior to your starting advise you of conditions in your place and suggest what you should do about them?

(a) Yes	5,701	92%
(b) No	181	3%
(c) Sometimes	49	1%

Inasmuch as the examining boss generally advises the miner and not the laborer of the condition of the working place, the negative answers to this question may not mean that the boss has neglected his duties. However, if the "no" and "sometimes" answers were recorded by miners, it behooves bosses who fail to advise the miners of working-place conditions to "mend *their* ways."

30. Do you examine your working place before starting to work for:

	Yes
(a) Roof conditions?	5,693
(b) Gas?	5,374
(c) Props and timber?	4,882
(d) Ventilation?	4,594
(e) Conditions after blasting?	4,783

Here again the miner and not the laborer is responsible for making the examinations, and, since many laborers very likely answered one or more of the subdivisions of this question, the answers do not have too much significance.

31. How long after you start working does the boss visit your working place?

(a) First hour	1,288	21%
(b) Second hour	2,563	41%
(c) Third hour	1,373	22%
(d) Later	607	10%
(e) No answer	380	6%

It is a distinct credit to management to have the mine-workers declare that 94% of the working places are given at least one official inspection during the shift, and the answers to Question 33 support this statement.

32. How much time does the boss spend in your working place on his visit?

(a) Less than 15 min	1,184	19%
(b) 15 min	3,670	59%
(c) 30 min	881	14%
(d) 45 min	159	3%

33. How often does a boss visit your working place during your shift?

(a) Once	3,202	52%
(b) Twice	2,320	37%
(c) Three times	284	5%
(d) Four times	67	1%
(e) No answer	338	5%

34. Does the boss on his visits examine your place for:

	Yes
(a) Gas?	4,623
(b) Ventilation?	3,767
(c) Roof safety?	5,292
(d) No examination	465

The answers to Question 33 revealed that 95% of the working places are being visited at least once during the shift. However, the answers to Question 34 indicate that some foremen merely visit the places and make no effort to examine them to determine whether dangerous conditions exist. It is gratifying to note that most of the official inspections include an actual test of the roof. Since more anthracite fatalities are caused by falls of roof, face and rib than from all other causes combined, it is imperative that officials as well as miners test roof when examining places.

35. Does the boss discuss the condition of your working place with you and make corrective suggestions?

(a) Yes	5,524	89%
(b) No	434	7%

36. Does the boss ask you for suggestions or opinions regarding:

	Yes
(a) Gas?	2,960
(b) Ventilation?	2,743
(c) Roof conditions?	3,795
(d) Opinions not asked for	1,557

37. What sort of attitude does the boss show on his visits to your working place?

(a) Abusive, fault finding	1,176	19%
(b) Pleasant, cooperative	4,097	66%
(c) More coal	2,592	42%

These answers disclose a few reasons why some foremen have far worse accident records than others. No miner can be expected to work safely when he is subjected to abusive language or when "coal first" is substituted for "safety first". Management should heed this advice and do something about it promptly to improve labor-management safety relations, which are so vital to accident prevention.

38. In giving you orders, does the boss resort to:

(a) Profanity?	419	7%
(b) Abuse?	377	6%
(c) Neither?	5,036	81%
(d) No answer	379	6%

39. On his visits to your working place, does the boss ask you about such matters as:

	Yes
(a) The health and welfare of yourself and family?	1,900
(b) Sports and social activities?	1,263
(c) None	3,340

It is difficult to understand how any boss can expect to gain the confidence and good will of his employees by resorting to abuse when things don't go right, or by failing to treat others as he would like to be treated if their positions were reversed.

40. In putting up props or timber, do you put them up:

	Yes
(a) On orders of the foreman?	991
(b) When necessary?	4,760
(c) 4 ft apart?	2,548
(d) 6 ft apart?	2,735

41. Do you believe that most roof-fall accidents are caused by:

	Yes
(a) Neglect of miner to make adequate roof tests?	2,426
(b) Failure of miner to determine accurately condition of roof by tests or observation?	1,995
(c) Miners and laborers in a hurry to load coal and go home?	2,624
(d) Neglect of miner to stand enough props?	2,571
(e) Refusal to stand props when ordered?	1,202
(f) Not enough bosses to intelligently inspect and supervise the work in miners' places?	839

If any reader feels that the replies have been deliberately falsified to make the miners appear "lily-white" and management as the "bugaboo" in safety matters, the frank and undeniably honest answers to Question 41 should dispel such doubts.

Who Found Our Coal?

New light on the early discovery and use of coal shows . . .

THE MEN: French explorers and traders

THE PLACE: Northern Illinois

THE TIME: The 1670's

By HARRY L. SPOONER, Peoria, Ill.

WHO FIRST FOUND COAL in America? Who first used it industrially? Who first burned it to keep homes warm?

Seventy-seven years before the first commercial coal mine in America was opened near Richmond, Va., in 1750, French explorers, pushing through what is now northern Illinois, charted a deposit of *charbon de terre* near the present city of Ottawa, Ill. The year was 1673.

In that year, the governor of New France, now Canada, sent Louis Joliet down the Wisconsin and Mississippi Rivers as far as Arkansas. Along with Joliet came Father James Marquette. On their return journey, advised by friendly Indians, they turned up the Illinois River. They stopped briefly at Kaskaskia, a large Indian village some 7 or 8 mi south of Ottawa, and there, while Marquette preached, the party discovered an outcrop of bituminous.

Joliet's map of his journeys, drawn in 1674 from memory after his original map had been lost in an overturned canoe, reached only a few people. But it did become a state document. A similar map, drawn by Marquette, fell into the hands of a French publisher named Thevenot, who printed it in 1681. Marquette's map also spotted the coal deposit.

ON TOP OF STARVED ROCK, on the Illinois River, America's first coal-burning forge was built. Nearby, pioneer traders warmed their homes with outcropping coal.

In 1679 Robert de la Salle led another expedition, following the Illinois to its confluence with the Mississippi. One of his party, Father Hennepin, was the historian. Hennepin's journal mentions a "cole mine" near Kaskaskia and two maps that he drew, one in 1689 and the other in 1697, show the location of the deposit.

The la Salle party built Fort Crevecoeur near the present city of Peoria. There they installed a blacksmith's forge to make nails and other metal pieces for a boat that would take them farther down river. Though a seam of coal lay near the surface, charcoal seems to have been used altogether in the forge.

While la Salle returned to New France his lieutenant, Tonty, built another fort on Starved Rock, a large promontory jutting out to the river's edge, almost directly across from Kaskaskia. But while la Salle and Tonty were absent, the men at Fort Crevecoeur burned the fort and threw the forge into the river. Tonty returned to Fort Crevecoeur, retrieved the forge and set it up on Starved Rock. Coal was brought in from the nearby outcrop to fuel the forge. Thus here, at Starved Rock, coal was first used commercially in America.

The area near Starved Rock soon was settled with traders, who built their cabins and storehouses in a row facing the river. Some of these frontier traders built stone furnaces beneath their cabins and burned coal to keep warm. As far as is known, they were the first men in America to use coal for home heating. Many years after the French and Indians had gone, permanent settlers found nine of these furnaces beneath the wilderness debris.

The coal deposit marked on Joliet's map was not mined on a large scale until recent years. It is a part of the Illinois No. 2 seam.

Efficient

BIG SHOVELS and other high-capacity stripping units require proper pit layout, good maintenance and constant study to be effective.

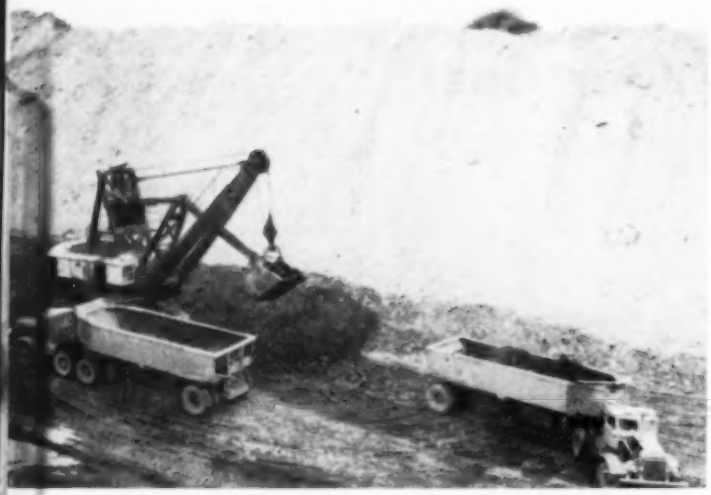
MOVING MORE THAN 100,000 cu yd of overburden and mining about 5,500 tons of clean coal is the daily duty of the employees and their machines at Middle Grove mine, Midland Electric Coal Corp., Farmington, Ill. The job also includes washing, sizing, wintertime drying and shipping of the coal which is produced from the Illinois Nos. 5 and 6 seams. And binding all this together into an effective unit are (1) a hard-working management staff, which provides coal lands to work in, furnishes tools to work with, and sells the product in the marketplace; (2) diligent engineers, who plan the work to achieve smooth, efficient operations; and (3) a sharp maintenance team which places the accent on "productive" maintenance, rather than "preventive" maintenance.

Among the striking features of Middle Grove operations are the following:

1. High-capacity stripping and loading units move cover and lift the coal at a rapid rate. Haulage duty is shared by a fleet of 30-ton trailer-and-tractor units which haul the coal out of the pit to a transfer point and 50-ton company-owned railroad cars which operate between the transfer point and cleaning plant.

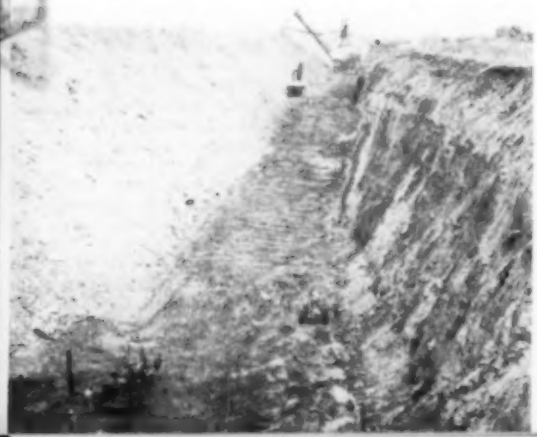
2. The power-distribution system is designed to provide maximum safety for the men in the pit and maximum protection for the equipment, while insuring adequate voltage at the powered units.

3. A new washbox and drier supplement the original washbox and a pair of home-designed driers in main-



LOADING SHOVEL, with 7-yd dipper, loads Illinois No. 6 coal to 30-ton haulage trucks which transfer coal to 50-ton railroad cars.

END-ON VIEW of No. 5 pit shows coal drilling in foreground and stripping and loading in the background.



UNNECESSARY DELAYS of 1 hr can add up to 1,800 cu yd of lost overburden removal for this 40-yd shovel.

Big-Shovel Stripping

In using high-capacity stripping equipment, Midland Electric Coal Corp. plans ahead to keep the units at work and studies the machines to limit down-time. Cleaning operations follow a similar pattern.

taining the quality and desired quantity of the company's product, Bright Star coal.

4. The engineering department, chief electrician, master mechanic and shovel operators cooperate in running a continuous time study on shovel performance. As explained later in this article, the idea has paid off in better shovel performance because recurring delays are quickly pin-pointed by the studies and are corrected by the electrical and mechanical departments, usually by changing designs slightly or by specifying different parts.

5. Grading of the spoil banks is an integral part of operations and closely follows the removal of coal. Grading is followed by planting under the direction of a full-time farm manager.

Here's a description of how Midland Electric achieves efficient, well-balanced operations at Middle Grove.

MINING AND HAULAGE

Present operations include two pits, one in the No. 6 seam and the other in the No. 5.

In the No. 6 pit, the stripping units are two electric-powered Marion Model 5560 shovels, one with a 26-yd dipper and the other a 23-yd dipper. The loading unit is a Marion 4121 electric shovel with a 7½-yd dipper. The stripping shovels work 3 shifts per day, 7 days a week, the one with the larger dipper moving 1,400 cu yd per hour and the other moving 1,150 cu yd per hour. The loading shovel operates on the first shift only and produces about 2,500 tons of clean coal in the 7¼-hr shift. Neither the overburden nor the coal is shot in the No. 6 operation.

In the No. 5 pit, the stripping unit is a Marion 5561 electric shovel with a 40-yd dipper. It works 3 shifts 7 days a week and produces at a rate of 1,800 cu yd per hr. The loading shovel is a Marion 4120 (7-yd) which operates on the second shift only and produces about 3,000 tons of clean coal in the 7¼-hr shift.

Both overburden and coal are shot in the No. 5 workings, where a Sullivan highwall drill, operating atop the uncovered coal, places horizontal holes in the limestone and shale cover, and a shop-made drilling rig, equipped with two pneumatic drills on adjustable arms, drills the coal. Du Pont 40% dynamite with electric igniters is the blasting medium.

Cover and seam thicknesses in the two pits are as follows: Over the No. 6 seam, the cover varies from 10 to 70 ft in thickness and averages about 45 ft. The seam is from 4 to 4½ ft. thick. Overburden at the No. 5 workings is running about 50 ft thick and the seam is 3½ ft thick.

Though Middle Grove has been in operation since 1933, the work has not been confined to a single continuous pit but has encompassed several pits in the general vicinity. Each new pit is opened through a 100-ft-wide box cut along a line far enough from the crop to insure high-quality coal. Succeeding cuts are narrower as the cover becomes deeper to make it possible for the shovel to stack spoil without rehandling. The loading shovel recovers the coal in two passes.

Haulage units for pit service are a fleet of 24 Dart tractors with 30-ton Austin-Western trailers. All haulage roads are built atop the coal, the running surfaces consisting of compacted shale and rock which is placed by auxiliary trucks. Dozers, graders and sprinkler trucks are in constant service maintaining the roads in top condition. For recovering the coal left under the haulage roads, the company recently purchased a diesel-powered Marion shovel equipped with a 3-yd bucket. They were selected because the quantity of coal involved does not warrant tying up the main loading shovels in such work, and the diesel drives eliminate the need for carrying trailing cable to isolated and separated working sites.

The trucks haul the coal out of the pits (No. 6 on the first shift and No. 5 on the second) to the transfer station, where it is dumped and loaded to company-owned standard-gage 50-ton railroad cars. Two 90-ton steam locomotives and 40 of these bottom-dump cars provide main haulage between transfer station and cleaning plant.

For controlling water in the workings, the company uses 6-in Fairbanks-Morse pumps mounted on shop-made wagons, which are moved about as required by a small gasoline-powered tractor. Wherever possible, water is impounded to provide numerous filling points for the sprinkler trucks.

POWERING THE MACHINES

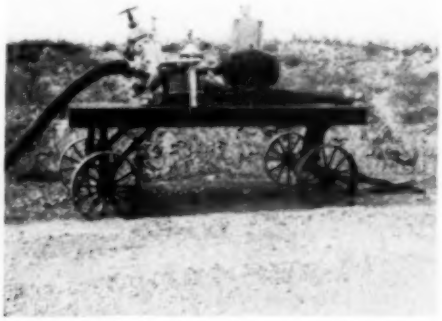
Midland Electric's mines and cleaning plant are powered through three substations, two serving the mines and the other the plant. Power is purchased from the Central Illinois Light Co. and is transmitted from the plant at Peoria, 30 mi to the east, at 33,000 v. The two substations at the mines step down this potential to 4,160, and another at the plant steps down further to 440.

In distributing the power to the units in the pits, the company makes use of 1½ mi of pole line and 5,000 ft of armored cable laid out near the top of the highwall. Switchhouses which serve as connection places for the equipment trailing cables are installed at each 1,000-ft point in the armored cable. They are equipped with oil circuit-breakers and isolators for connecting the shovels to the distribution network and they also provide for overload and ground-fault protection.

The two main pit substations feature resistance-grounded-neutral systems, which limit fault current to 50 amp, and are equipped with ground-trip relays timed to take the substation off the line in ½ sec when a fault occurs. The set-up provides that 100 v is the maximum potential difference across a man's body if he is touching the machine at the time a fault occurs. A metallic neutral throughout the distribution system connects each machine with the substation ground resistor through a solid circuit. All cables are Type SHD, Simplex or Okonite.

Midland Electric also offers ideas on splicing cables and for moving the cables and switchhouses back as the highway advances. The splicing is done in a portable cable-repair shop which is placed along the highwall where cables can be brought to it. Splices are covered with rubber tape, confined in a shop-made mold, as shown, and vulcanized at 393 F in a paraffin bath which is heated electrically. The cables are moved about by placing them in a yoke resembling a segment of a sheave, which is designed to preserve the minimum allowable bend radius of the cable. Then the flat plate, to which the yoke is welded, is towed by a small tractor or by a team of horses, if rains make it impossible for the tractor to find a grip in the tall grass or mud

SWITCHHOUSES (left photo) contain oil circuit breakers and isolators for connecting shovels to 4,160-v line. Top half of shop-made splice mold is shown in the right photo.



COAL DRILL (left) consists of a truck chassis, air compressor and two swing-type drill arms equipped with pneumatic drills. Pump wagons (right) are hauled from place to place as needed by a small tractor

Shop-made units effectively provide auxiliary pit services

atop the highwall. The tractor is the same one which hauls pumps from place to place, so the horses also do the work when the tractor is not available. And their barn, like all other units on the highwall, is skid-mounted.

CLEANING THE COAL

Returning to the subject of preparation, here is a run-down on how the mine product is processed into Bright Star coal.

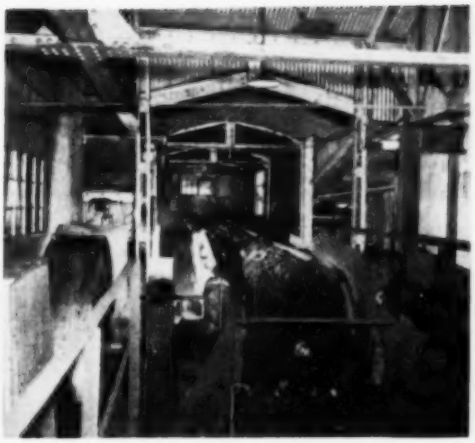
The 50-ton railroad cars, which receive coal from the 30-ton trucks at the transfer station, are dumped into a 250-ton plant feed hopper. A reciprocating feeder at the bottom of the bin feeds the coal to a 54-in belt conveyor which discharges at the top of the plant to the 8-ft-wide main screen. Here the plus 6-in material is scalped for hand picking, then crushed to minus 4 in and directed to the washboxes. The minus 6-in goes directly from the main screen to the washboxes. The jigs are a 250-tph Link-Belt and a 500-tph McNally Mogul, the latter new last Spring.

Clean coal from the washers is discharged to two dewatering screens which also make an initial size split at ¾ in. The minus ¾-in fraction is divided among four Robins Eliptex screens which reduce the moisture to about 26%. Then the fraction is returned to the circuit for blending with other sizes.

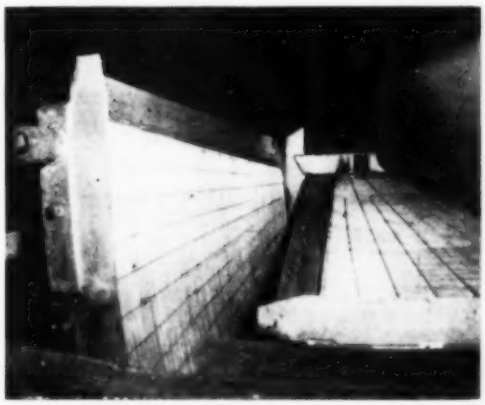
The 6x¾ is discharged to a 48-in wet-coal screen for further dewatering and from there to the classifying screens to be split into 6x4, 4x2, 2x1¼ and 1¼x¾ sizes. The size fractions are then directed to the loading booms or to the mixing conveyor, which provides the plant with a high degree of flexibility in meeting orders for a number of sizes.

The clean coal averages about 7% ash for No. 6 coal and 10% for No. 5. As previously mentioned, No. 6 coal is run during the first shift and No. 5 during the second shift.

To prevent in-transit freezing from becoming a problem in the winter, the minus ¾-in fraction is divided among three drying units, two Bixby



MIDLAND ELECTRIC'S 50-ton railroad cars (left) dump into 250-ton plant feed hopper, from which the feed belt (right) conveys raw coal to main screen. Plus 4-in is scalped for hand picking and minus 4-in is directed to washboxes.



TWO CYLINDRICAL DRIERS have four tiers of rotating screens which tilt like this to drop coal down to hopper.

PASTURELAND in background and first-year oats are on land that has been stripped and graded by Midland Electric.

Midland's Credo: Good mining and cleaning, complete reclamation

and one McNally Vissac. The drying rate in each unit is about 50 tph, with the moisture content being reduced from 26% to 16%.

The Bixby units are 14x24-ft cylinders which receive both coal and hot gases at the top. The coal drops down through a series of four tiers of screens spaced 5 ft apart vertically, the screen segments being tilted by a camming arrangement as the entire screen assembly is rotated by a central shaft. Thus, the coal is carried completely around each tier in the presence of the hot gases before being dropped to the next lower tier.

Screen surfaces of the bottom tier are made of $^{3}/_{32}$-in Bixby-Zimmer wire with ½-mm openings. The upper screens are ⅛-in wire with $^{5}/_{16}$-in openings. The bottom screen dumps the dried coal into a hopper from where it is returned to the circuit for loading or blending with other sizes.

The McNally-Vissac drier is a recent installation which will increase Midland Electric's capacity to produce coal that customers can handle more easily in cold weather.

★ ★ ★ ★ ★

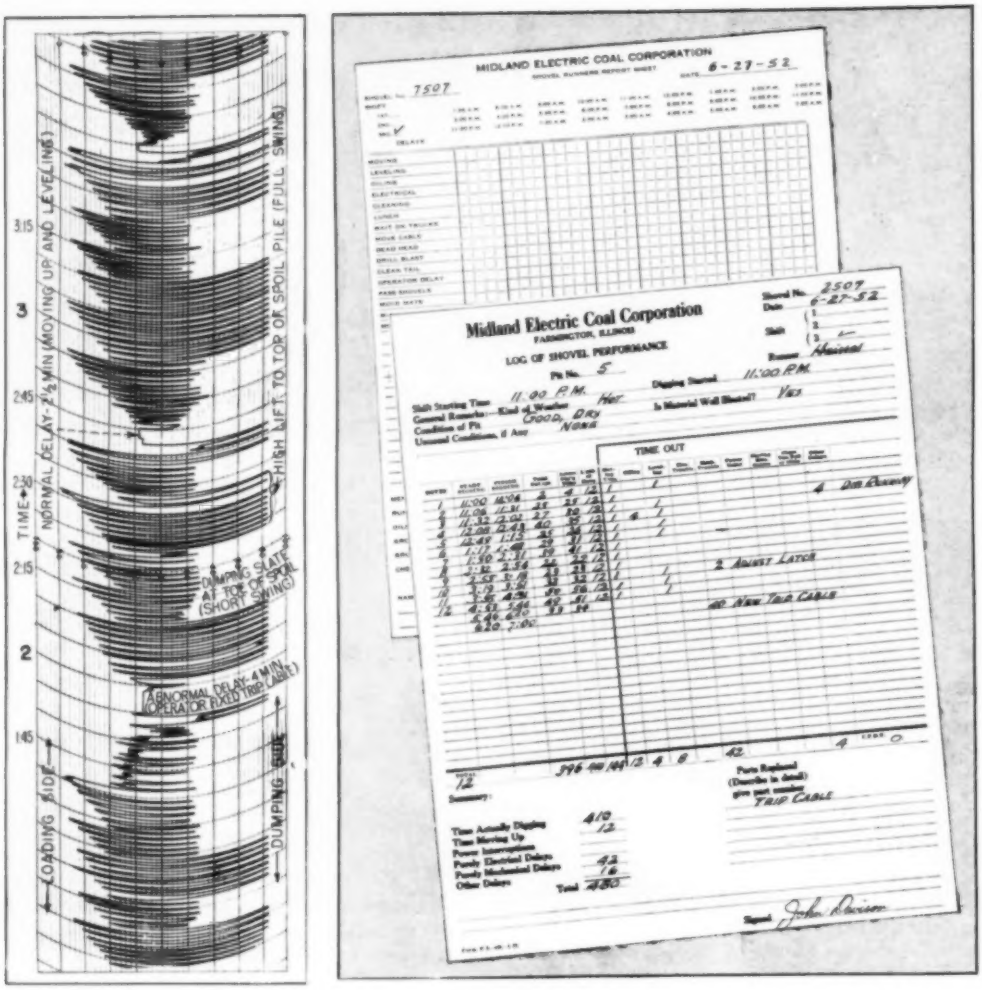
Ain't It the Truth!

The world is full of willing people — some willing to work, the others willing to let them.

SHOVEL STUDIES PAY OFF

Middle Grove's mining efficiency depends almost wholly upon the performance of the big shovels. To insure uninterrupted operation, the engineering, electrical and mechanical departments, and the shovel operators, cooperate in running continuous time studies and in evaluating the data.

The data are taken automatically by a clock-actuated recorder on each shovel that produces a "swing-gram" (see next page), which is a qualitative picture of what that shovel has been doing. Flat arcs indicate normal operation but vertical lines indicate delays, since the shovel is not working when it is not swinging.



SWING-GRAM and Shovel Runner's Report are combined to make the Log of Shovel Performance, which is studied to find possible patterns in delays.

Some delays are necessary, as when the shovel is tramming forward to stay within reach of the retreating highwall or when it is leveling. On the other hand, longer delays are abnormal, and the operator describes these abnormal delays on a report form which hangs near him in the cab. Note that this "Shovel Runner's Report Sheet" carries a column for each quarter-hour in the shift. Thus, long delays on the swing-gram may be identified by referring to the operator's report sheet.

Each day the engineering department uses the swing-gram and operator's report to prepare a "Log of Shovel Performance" for each unit in service. Then engineers and maintenance officials study the logs for patterns in the incidence of delays. When patterns are pin-pointed, measures are taken to correct the condition which causes the recurring delays.

RECLAIMING THE LAND

Several bulldozers operate full-time on the spoil banks, closely following the stripping and loading operations. Their job is to grade the spoil to the limit of the dozers' effectiveness as grading machines, and not merely to round off spoil peaks.

Most of the land is planted as soon as possible after grading, some of Midland Electric's former spoil areas now serving as excellent pasture for cattle and horses. In other areas, healthy stands of locust and other trees are in evidence, and one of last year's spoil areas sprouted a lean but encouraging crop of oats from its first planting this year.

Heading up Midland Electric's team are T. C. Mullins, president; W. E. Mullins, vice president—operations; and R. K. Ronk, general superintendent. W. H. Weimer is chief engineer; C. E. Crawford, chief electrician, and H. W. Brentz, master mechanic. Pit supervisors are W. W. Youngblood, superintendent at No. 6, and Charles German, superintendent at No. 5. Al Grandt is farm manager.

Piano Wire Cleans Conveyor Belt

"THERE'S THE BEST BELT CLEANER we have found", said E. F. Talbott, superintendent of the Roseann (Va.) mines of the Panther Coal Co., Inc., pointing to a turnbuckle and 5-ft length of piano wire when showing a *Coal Age* editor around the new Splashdam operation (p 99 of this issue).

The wire, which clears the surface of the belt by about 1/32 in, is located within a few inches of the belt's final contact with the head pulley where it maintains a constant distance from the wire. To insure long life, it is essential that the belt be cleaned at this point because a few feet farther on the carrying side contacts the surface of the drive pulley. Any material not cleaned from the belt before coming in contact with the drive pulley would cut and bruise the belt, causing decreased life. Vulcanized splices eliminate the possibility of fasteners catching on the wire.

This idea was tried at the Leckie operation on the suggestion of an employee who had visited a lead and zinc mine where it had been used successfully.

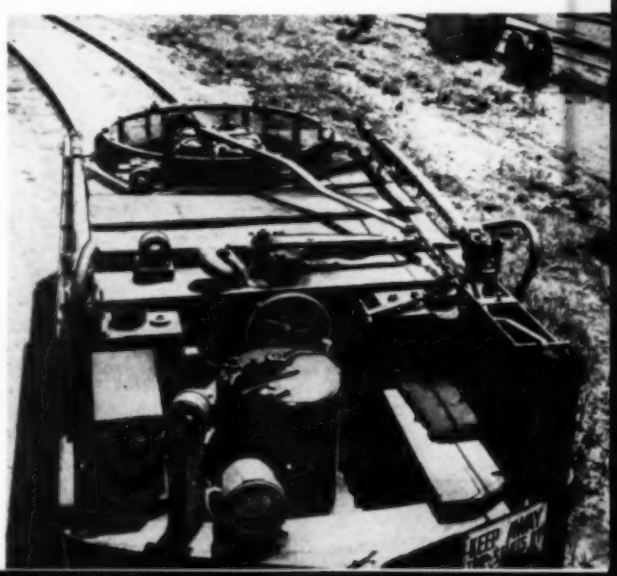
PIANO WIRE, held tight by angle-iron pedestals and turnbuckles, clears the belt surface by a small fraction of an inch to cut clinging particles from the belt.

Mine-Built Remote-Control Moves Trip Locomotive in Shuttle-Car Sections

A REMOTE-CONTROL, designed and built by Joseph Krese, master mechanic, Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., Westland, Pa., reduces power and maintenance costs and permits smoother operation of a trip locomotive. The unit, used on shuttle-car sections, is operated by a control button located so the shuttle-car operator can control trip movements from his seat on the shuttle car.

Featured in the control arrangement is a mechanical-electrical combination which sets the brake when the power is off and releases it when the power is on. A 2x½-in piece of iron, pin-connected to a rigidly-connected short arm on the cable-reel shaft, extends to and connects with the hand lever operating the brake. A length of 2-in chain extends from the brake lever to the locomotive cab and is attached to an arm which supports a 25-lb weight. When the shuttle-car operator pushes the control button, putting power on the system, the reel motor is actuated, releasing the brake and raising the weighted arm. The locomotive then moves without the brake being on. When the control button is released, the system is de-energized and the weighted arm pulls the brake lever, setting the brake. A switch installed on the sand box disconnects the mechanism when the locomotive is to be operated in the regular manner.

In addition to giving smoother operation of the locomotive, with savings in power and maintenance, the system is practically trouble-free, Mr. Krese reports.



Additional work-proved "Operating Ideas" on pp 114, 116 and 117.

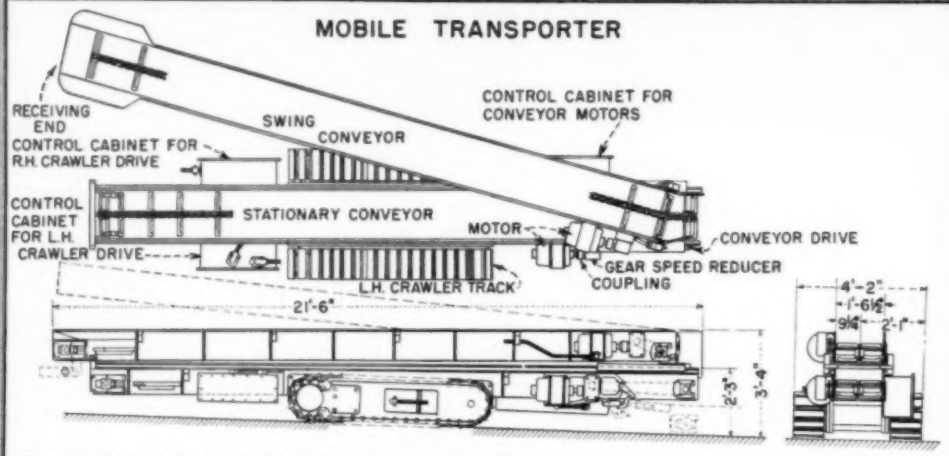


FIG. 1—**CRAWLER-MOUNTED** mobile transporter unit, with extensible receiving conveyor, receives coal from the extractor and passes it on to conveyors.

New-type machines are key to continuous-flow mining

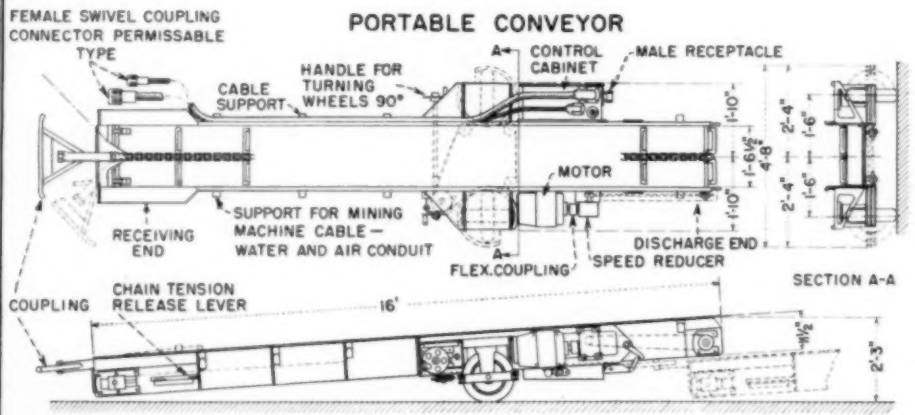


FIG. 2—**PORTABLE CONVEYORS,** mounted on 18-in wheels and designed for mobility, receive coal from the mobile transporter and provides for lengthening or shortening the system as the face advances or retreats.

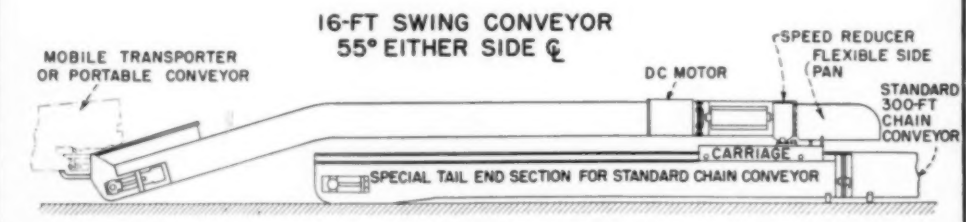


FIG. 3—**SWING CONVEYOR** receives coal from the mobile transporter when room necks or other openings are turned and from portable conveyors in series in regular development.

Here's How to Get Production-Line Mining

Suggested design and application of automatically controlled transportation units to provide a constant coal flow from a continuous miner to the haulage system.

By PHELAN McSHANE, Consulting Engineer
Westinghouse Electric Corp., East Pittsburgh, Pa.

MINING COAL is a mass production industry—the greatest of all—yet production-line methods, so successfully used in other great industries, are not employed, for the simple reason that suitable equipment has not been available.

Admittedly, the application of production-line methods to coal mining is more difficult than in some other industries, but the difficulties are not unsurmountable. Variations in roof, bottom, seam thickness and many others complicate the problem, but their solution will be rewarding.

An unbroken and continuous flow of coal from the face to the shipping point at the lowest possible cost is the goal of production-line mining. To obtain these results requires more than a machine that will break coal from the solid and load it in, or on to something. Equipment differing from the conventional types now in use to receive coal from a mining or loading unit, is essential if low cost is to become a reality. Low cost in other industries was not achieved by the use of devices and methods peculiar to the past.

PRODUCTION-LINE REQUIREMENTS

If the possibilities of the combination extracting-loading machine, otherwise known as the continuous miner, are to be fully exploited, everything must be done to keep them operating continuously.

Some of the things necessary for a production line are summarized as follows:

1. A mine layout that permits unhampered movement of the extractor and other equipment necessary to transport coal and supplies.

2. A transportation system that is always available, and of sufficient capacity that the normal and momentary peak production of the extractor will not be restricted.

3. A transportation system sufficiently flexible to follow at all times the erratic movements of the extractor discharge. The system should be able to function wherever the extractor is used, whether in driving entries, turning room entries and driving them, driving cross-cuts or recovering pillars. It should permit turning all openings at 90 deg as lesser angles increase hazards and introduce roof-support and other problems.

4. Means to move the elements of the transportation system into entries and rooms when advancing, and out when retreating.

5. Means of extending and shortening the transporting means in entries and rooms quickly and easily.

6. Equipment that incorporates, as an integral part, the conductors for power, control, water, and, if needed, compressed air, wherever required. This greatly reduces replacement, repair and labor costs, relays and hazard.

7. A control system that permits the extractor operator, in his normal operating position, to cause the transporting means to advance as the face is advanced.

8. A control system that will cause all motors to automatically stop and start in sequence. These features will eliminate spillage, reduce labor cost, delays and down time.

9. A control system that provides as a convenience, as well as a safety measure, means to stop all motors in the transportation system simultaneously anywhere on either side of the transportation system.

10. A control system that provides individual overcurrent protection for each motor, and isolation of power and control conductors if a short circuit or ground fault occurs. These features not only minimize shock, explosion and fire hazards, but save time by facilitating location of trouble.

11. Avoidance of acute angles in the transporting means when transferring coal from one device to another, to reduce coal breakage and undue wear of the equipment.

12. Good voltage at every motor always. Low voltage, hot equipment, including conductors, and low production go together.

13. Last, but very important, a high regard for time.

Having outlined the requirements, consideration of the equipment to meet them, is in order.

Production-Line Equipment

THE MOBILE TRANSPORTER

DUTY—Receiving coal directly from the extractor and passing it on to conveyors.

MAJOR COMPONENTS—Extensible receiving conveyor, stationary main or discharge conveyor and a crawler-propelled mounting (Fig. 1).

This article discloses some of the work done by the Mining, Planning and Development Engineering Section of the Westinghouse Electric Corp. in its effort to assist in the solution of mining problems.

The two crawlers are individually powered. Since they are required to move not only the mounting to the transporter, but also one or more portable conveyors in series, the crawlers should be able to exert a drawbar pull of 5,000 lb.

The receiving end of the extensible conveyor is attached to the discharge conveyor of the extractor by a coupling with the characteristics of a ball-and-socket joint. Being so attached, it follows the movements of the extractor automatically. The discharge end of the extensible conveyor is hinge-mounted in a unusual swivel, part of a roller-mounted carriage, moving back and forth on channel-ways mounted on the sides of the discharge conveyor as the extractor moves back and forth. The discharge conveyor forms the carriage of the transporter, with the crawlers attached so they can be readily removed if repairs are required.

The extensible conveyor can be extended and retracted 17 ft, can be swung 90 deg to either side of the transporter center line and is free to raise or lower as necessary in following the extractor. Over-all design permits the transporter to follow the extractor around corners or wherever it goes.

POWER AND CONTROL—When the extensible conveyor has been fully extended by the forward movement of the extractor, the extractor operator, from his normal working position, can energize the crawler motors to move the transporter and any portable conveyors hooked to it forward for a new cycle of advance.

Buttons located on both sides of the transporter provide control for all motors and permit the transporter to be moved by the extractor operator, or by others at the transporter.

Explosion-proof safety-type plugs are provided for the receptacles on the power conductors and control cables. Means also are incorporated in the control system for stopping all conveyors if the main conveying system stops, and for restarting them automatically in sequence when the main system resumes operation.

PORTABLE CONVEYOR

DUTY—To receive coal from the mobile transporter and provide for lengthening or shortening the conveying system as the face is advanced or the pillars extracted on retreat. The portable conveyors are coupled to the mobile transporter, to each other and to the swing conveyor, thus acting as the link to the entry conveyor, and are pulled forward through couplings by the mobile transporter (Fig. 2).

DESIGN—Conveyors for the coal-production line must be easy to move, not only forward, back and obliquely, but also directly sideways. Therefore, the conveyors are mounted on 18-in rubber-tired wheels so they will pass over obstructions easily. The wheels are steerable through gear operable from either side of the conveyor, with the vertical pivots directly over the vertical center lines of the wheels and their axle, reducing effort required to deflect the wheels in any direction. This type of mounting also eliminates the wobbly erratic motion of caster-mounted wheels.

The conveyor is mounted in its carriage so that it can be lifted directly out to facilitate repairs and replacements. The conveyor motor, controller, speed reducer and coupling also are mounted on the carriage, relieving the conveyor structure of stress and permitting easy removal and replacement of the motor or speed reducer if necessary. Speed-reducer mounting and location permit use of a chain drive, which is not only good construction but permits easy quick replacement of the chain-conveyor drive sprocket, shafts and bearings.

COUPLING – Although complicated-looking, the coupling used between portables, and portable and transporter and swing conveyor is designed to facilitate coupling and uncoupling, regardless of horizontal and vertical conveyor alignment. Provisions are made for moving a portable unit directly sideways out of a line. Coupling design provides for transfer of coal from one unit to another without spillage, and for coupling or uncoupling from either side.

POWER AND CONTROL—Twenty-five portables can be operated in series and each is provided with a plug, receptacle and power and safety-ground conductors of sufficient capacity for operation of the entire series. Similar plugs and receptacles are provided for the control circuits required for simultaneous control of the conveyors, including the transporter conveyors. Provision is made for stopping the conveyors or any unit feeding onto them from either side for the entire length of the conveyor. Conduits for spray water, fitted with quick-acting self-sealed couplings, are provided on each portable conveyor. Starting and stopping is in automatic sequence.

SWING CONVEYOR

DUTY—Receiving coal from the mobile transporter when room necks or other openings are turned, and from a portable conveyor or portable conveyors in series in regular room or heading production.

DESIGN—Except for being shorter, and for the absence of rubber-tired wheels, the swing conveyor is similar to and functions like the extensible conveyor on the mobile transporter. The carriage on which the discharge end is mounted, rides on a special tail section attached to a standard entry conveyor (Fig. 3).

The swing conveyor, like all others, is individually powered, and features the same design to facilitate replacement of parts subject to wear, since it is important not only to have a production-line setup that functions well but also one that can be returned to service quickly when a part needs replacement. "Replacement" is used advisedly since it, rather than repairing, is the key in a production-line system.

Production Cycle

The equipment can be used in a number of ways. One is as follows:

It is assumed that five entries have been driven to the property line, or other desirable limit, an area is to be extracted on retreat, and a room neck is to be turned. To do so, the tail section of an entry conveyor is located 60 ft down the entry from the centerline of the room to be turned, providing space for the extractor and transporter. The carriage of the swing conveyor is placed on the rails on the tail sections of the entry conveyor and in the retracted position. Its receiving end is coupled to the discharge of the extractor. Extraction of the room entrance at 90 deg now may be started.

As the extractor advances it draws its extensible conveyor forward. Having extracted 15 lineal feet of coal, the extractor operator, from his operating position energizes the transporter crawlers and advances the transporter, which also causes the swing conveyor to advance 15 ft. As the extensible conveyor is now retracted, the extractor can advance and extract an additional 15 lineal feet of coal.

The crawler motors are again energized, and the transporter and the swing conveyor are advanced another 15 ft, or a total of 30 ft.

The swing conveyor now is uncoupled from the transporter, and it and three sections of the entry conveyor, after being unbolted, are drawn forward 30 ft by the capstan. The swing conveyor again is coupled to the transporter and the cycle is repeated, except that only two sections are added on the second cycle.

The swing conveyor now is in the position shown in Fig. 4. The extensible conveyor of the transporter is in the retracted position to receive coal from the extractor.

The extractor continues to advance until the extensible conveyor is fully extended. The swing conveyor then is swung to the left to the position shown by the dotted lines, and a portable conveyor is pulled up by rope and capstan. It is moved until the center line of its wheels is in line with the center line of the transporter. It is then rotated on its wheels 90 deg. coupled to the transporter and pulled forward by it to the position shown in Fig. 5. Then the swing conveyor is returned to the position shown.

The transporter is advanced until its extensible conveyor is in the retracted position. It then loads another 15 ft of coal and a portable conveyor is added. This procedure is followed until the room is completed, roof supports being installed while the portable conveyors are being added. The necessary number of portables to complete a room are all coupled together in the entry and are pulled up the entry by the capstan as needed.

When the room is completed, or when the pillars are taken on the retreat, the capstan is moved to the position shown by the dotted lines in Fig. 5. In this position, it is used to pull the line of portable conveyors out of the room. As the line is pulled back one length, the outby portable is uncoupled, rotated on its wheels approximately 90 deg. and pulled down the entry, using a rope and a block, with tension being supplied by the capstan. The portables removed from a place are stored to the right of the entry conveyor so they are in the preferred position when a place to the right is mined.

Use of the capstan, block and rope makes it unnecessary to use much manpower to move the portable or other conveyors. Since the wheels are steerable, a single conveyor can be moved sideways or obliquely out of the line when desired. It will be noted that the entire transportation system is placed close to the solid where it is comparatively safe. This is especially valuable where tender roof is encountered in developing entries and rooms or in recovering pillars.

Mine cables and pipes for power, water and compressed air could be suspended from the roof in the main entry in short convenient lengths, with appropriate receptacles or self-sealing couplings or service to the face (extractor) and transporting units through the conductors that are mounted on them. Thus there would be no cables, pipes or hose on the bottom to cause trouble.

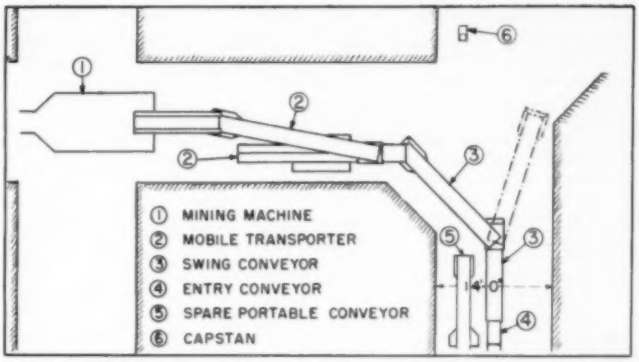


FIG. 4—ASSEMBLED EQUIPMENT in retracted position receives coal in breakthrough, transports it around 90 deg turn and discharges into entry conveyor.

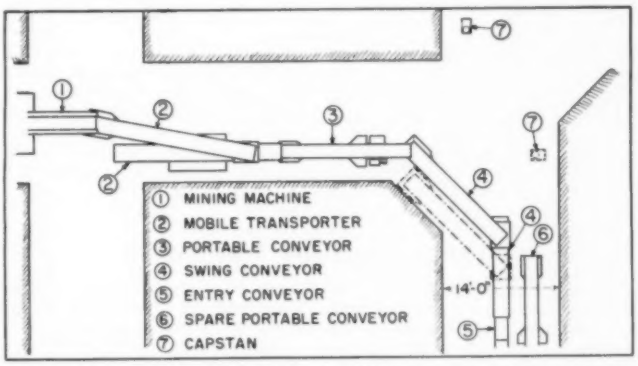


FIG. 5—ADDITIONAL PORTABLE CONVEYORS are readily installed as the face advances. Rope and capstan pull each new unit to position in conveyor line.

Production-Line Results

The first requisite to high production is keeping the extractor operating as continuously as possible. The second requirement is to convey the coal to the entry as fast as it is produced. It is true that the extractor must be stopped to install roof supports, which naturally will be done as quickly as possible. However, in line with the usual perversity of things, the less time it requires to install the supports, the more time there is to extract coal and the less time there is to transport it to the entry. Transportation is the bottleneck.

As a means of solving the transportation problem the equipment discussed above is a possibility. What might be accomplished with it is set out in the following.

It will be assumed that coal is to be extracted from a face 5 ft high and 14 ft wide, to a distance 400 ft from the center line of the middle entry of a 5-entry system. Each entry is 14 ft wide, and as coal has been removed from the entries, only 365 lineal ft requires extraction. The coal to be extracted, at 80 lb per cu ft, would weigh 1022 tons.

If the extractor could break down and load 3 tpm, and operate continuously, it could mine the 1022 tons in 341 min (5¾ hr).

If the extractor is 30 ft long and the effective length of the mobile transporter is 35 ft, or a total of 65 ft, 335 ft of conveyor would be required to transport coal to the middle entry. As the effective length of the portable conveyor is 15 ft, 22 of them plus the entry conveyor in the entry will have to be inserted to permit the face to advance 400 ft.

It will require no more than 3 min to install a portable conveyor, or 66 min total. On retreat, the conveyor must be drawn back by the capstan and removed, and an equal amount of time is allowed. It will, based on

this estimate, require 473 min (7 hr 53 min) to extract the coal and remove the conveyors.

To the 473 min, the time required to install roof supports must be added. If roof supports are installed on 2½-ft centers, 140 are needed in addition to the supports previously installed in the entries. If the extractor is halted 1 min while a support is being installed, 140 min of extracting time would be lost. However, 22 of the supports would be installed while conveyors were added, cutting the actual delay to 118 min.

Thus, extracting 1022 tons, including inserting and removing conveyors and installing roof supports, would require 591 min, 10 hr say, making the rate 102 tph or 714 tons for a 7-hr day. A maximum of 5 men should do the job, producing 143 tons per man.

The rib may be recovered, which would also add to the tonnage and time, but the flexibility of the system should result in a high production rate. Time for installing roof supports is reduced in this operation, making the need for continuous transportation even greater. The conveyors lend themselves well to this objective. To a large extent, if not entirely, individual conveyors could be removed to shorten the line while the extractor was dropping back to a new point of attack—time that could be subtracted from that required to extract on the advance. Incidentally, the capstan is useful in timber recovery.

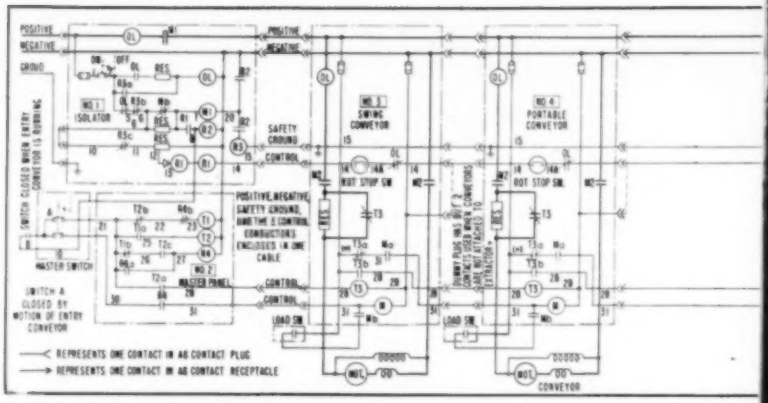


FIG. 6—FULLY AUTOMATIC CONTROL SYSTEM prevents damage to the conveyor system through use of limit switches, relays, and interlocks. Easily

Production-Line Operation

To review the operating cycle, the extractor, as it advances, pulls the extensible conveyor of the mobile transporter ahead 15 ft. Then the extractor operator stops the machine and, through a control switch, causes the transporter to move ahead 15 ft, pulling the portable conveyors ahead the same distance and causing the extensible conveyor, which is coupled to the extractor, to ride back to retracted position. The conditions for another distance now have been re-established.

To protect the extensible conveyor from being pulled too far forward or pushed too far backward, limit switches are provided to automatically stop the movement of the extractor or mobile transporter.

When the transporter has advanced enough to permit inserting another portable conveyor in the line, one of the two conveyormen normally stationed at the mouth of the place opens a control circuit by separating a plug and receptacle. This stops the forward movement of the extractor and shuts down all the conveyors. The portable is inserted, requiring about 3 men, during which roof supports can be placed and rockdusting done.

Reconnecting the plug and receptacle re-establishes the circuits, restarts the conveyors and other equipment and permits the extractor to resume its advance. If not stopped to insert a portable conveyor, the extractor will halt automatically when it attains the maximum advance.

There is no need for communication between the extractor operator and the conveyormen at the entry. To move ahead, the operator simply stops the conveyors, energizes the transporter driving motors and moves the entire line ahead. When a portable conveyor is added, the control circuit is opened, the conveyor is inserted, and the control circuit is re-established, starting all the equipment and permitting a further advance of up to 15 ft.

Separation of the control plug and receptacle, in addition to stopping the forward motion of the transporter, also stops all the conveyors and causes the contactors at the room entrance to open. Restarting is prevented until the plugs and receptacles are reconnected. This prevents accidental operation and promotes convenience.

When the plugs and receptacle are reconnected, the transporter will, if it should, resume its forward motion. The motors on all the conveyors, including the transporter and extractor, will restart. The conveyor motors will start in sequence beginning at the room entrance and ending with the extractor conveyor. Sequence starting assures that all conveyors will be running before material is deposited on them. It also avoids imposing high peaks on the power source, as well as overloading of breakers and conductors supplying the conveyor motors.

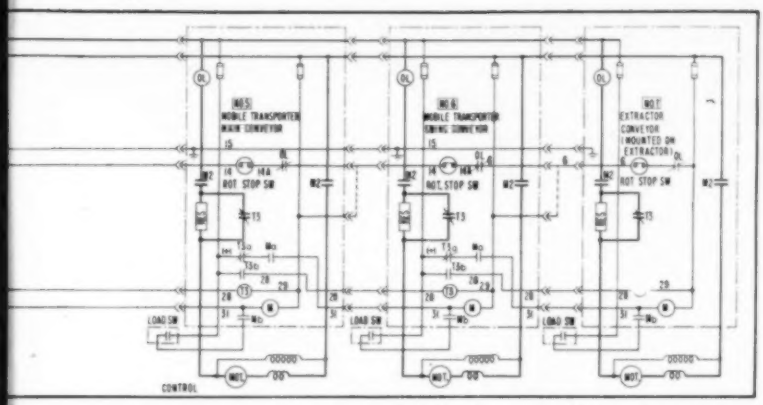
High peaks result in sagging voltage—always an undesirable condition, particularly in starting. Low voltage frequently is the cause of poor control operation, failure of contactors to close or welding of contacts in closed position as a result of low contact pressure. In addition, burned-out resistors, delays and expense are frequent results of low voltage.

A feature of this control system is that the line contactor at the room entrance never closes under load. Therefore its contacts will never freeze in closed position. Also, they always open before any power contactor in any controller opens. It is apparent, then, that should a power contactor in a conveyor controller fail to open for any reason, the motor it controls will stop. This feature is new, and provides a very valuable and unusual safety feature. If a short circuit or ground occurs in any motor, controller, or conductor in the system, the high-capacity contactor in the entry opens and relieves the smaller contactors of the duty of interrupting the circuit.

Provision is made for stopping all conveyors at the room entrance, along the entire length and on both sides of the portable conveyors, and at the extractor and transporter. For safety reasons, and to prevent coal from being piled on a conveyor that is stopped, if any stop switch is placed in the "off" position, no conveyor can be restarted until all stop switches are placed in the "run" position, and the contacts of the "start" switch at entry are closed.

RETREAT OPERATION

Where complete recovery is the



connected separate power and control circuits are provided for the extractor, mobile transporter and conveyors.

practice, ribs are of course removed on retreat. To remove the ribs, the extractor is turned at an angle. It then advances and extracts a section of the rib. The rib might be any reasonable thickness, say 12 or 14 ft. Even 15 ft would be satisfactory as the extensible conveyor can be extended that far and, in addition, swings either to the right or left.

When the extractor has completed its forward advance, a man, possibly one of the two men installing roof supports while room is being advanced, signals the conveyor man at the room entrance to draw back the conveyors. This man, having previously attached a rope to the coupler on the discharge end of the portable conveyor nearest the entry, puts a tension on the rope by means of a capstan in the entry. When the tension is applied the man at the transporter manipulates its control and moves the transporter back in unison with portable conveyors.

When the transporter has moved back sufficiently, the man at the room entrance is signaled to relieve the rope tension. Normally the backward movement of the production line would be sufficient to permit the removal of a portable conveyor. When uncoupled, the conveyor is turned 90 deg on its wheels and it and others previously removed are drawn down the entry.

A rope attached to the conveyor down the entry passes around a pulley and then back to the capstan at room entrance. The conveyor men at the room entrance can perform all operations necessary to place the conveyors in the room and remove them from it. They can move the conveyors in either direction in the entry with ease.

While the transporter is being moved back the extractor also moves back and into position to remove another section of the rib. This procedure, if continued, will result in complete removal of the rib and pillar at the room entrance. It also will leave all of the equipment in the entry and ready to turn the next room.

As to the crew, three are required to operate the equipment, plus an additional man part time on retreat. As the rate of production and advance is rapid, roof supports must be placed quickly if delays are to be avoided. Two or three men may be required to perform this task quickly. If supports are placed on 2½-ft intervals and the face is advanced 2½ ft in 2.33 min, a support must be installed every 3½ min—and in 1 min time.

Material to support the roof, if it requires support, must be brought to the face by others—and fast! The headings paralleling the one containing the entry conveyor can be used to bring in roof supports and supplies. As the portable conveyors can be removed from the production line sidewise, no problem is involved in getting supplies into the rooms. If timber is used to support the roof, and it probably will be required where complete extraction is involved, the capstan provides an ideal way to recover it.

PRODUCTION-LINE POWER

As the extractor and the mobile transporter are self-propelled, and at times are separated from the conveyors taking coal from them, separate power and control circuits are required for each. And as all the conveyors (including the discharge conveyor on the extractor, the two conveyors on the transporter, and the portable and swing conveyors) operate in tandem, separate power and control circuits are required for them also.

It is necessary and very desirable to provide means to connect and disconnect the circuits from the source of power at will, including automatically if excessive current flows, or if the machine frames attain a voltage above ground potential. It is necessary, therefore, that three such circuit-controlling devices be used.

To supply power to the equipment, a cable is fitted with a receptacle (with screw-type coupling) having contacts for positive, negative and ground conductors, and two control contacts. The two control contacts are to be electrically connected within the receptacles. These receptacles are to be coupled with plugs mounted on the room power isolators, to be described.

POWER ISOLATOR—The power isolator (Fig. 6) which is to be located in the entry, consists of a heavy-duty contactor (M), overcurrent relay (OL), three relays (R1, R2, and R3), three resistors, a small Rectox, and an "on" and "off" pushbutton. This apparatus is mounted in a non-explosion-proof cabinet. A receptacle and plug is provided for the incoming positive, negative, ground and control conductors.

The function of the first isolator is to establish and interrupt power connections to conductors supplying power to the conveyors including those on the mobile transporter and the extractor (rear discharge), and to isolate the conductors, and all electrical equipment from potential above ground potential when:

1. The push or rotary switch associated with the isolator is placed in the "off" position.

2. The control contacts associated with the "stop" switches on the conveyors, or mobile transporter or extractor, are placed in "off" position.

3. The control circuit contacts in any of the plugs and receptacles are separated (control contacts separate prior to separation of power contacts).

4. The overcurrent relay contacts associated with any conveyor controller, or the isolator, separate (overcurrent protection).

5. The frame of any device to which power is supplied is above ground potential (ground protection).

Should an overcurrent relay or the ground relay (R3) operate, the contactor in the isolator will open and remain open until the control switch in the isolator is returned to the "off" position and then placed in "on" position (overcurrent isolation). This is a safety feature, and also encourages determining why the relays operated.

MASTER CONTROL PANEL—

The master control panel is intended for location near the room entrance, preferably near the power isolator associated with the conveyor drives.

Two timing relays and one small relay constitute its apparatus. Functions are:

1. Establishing a starting circuit to the controller on the conveyor discharging to the entry conveyor.

2. Initiating a timing circuit assuring the insertion of resistance in series with the power circuit to the first and all subsequent conveyor motors prior to the closing of the contactors establishing a circuit to the motor.

3. Providing a circuit permitting the conveyors to restart automatically when the "stop" contacts on the switches associated with the several conveyor controllers are returned to the closed position. Note: All "stop" switch contacts on the conveyors must, for safety reasons, be closed before any conveyor will restart.

Further attributes will be disclosed in the following description of operation of the control system in its entirety.

CONVEYOR CONTROLS – Each conveyor–transporter, portable, swing and extractor, is driven by a separate motor; each motor is controlled by a separate controller; and each controller is enclosed in an explosion-proof cabinet designed for mounting on the machine and motor drives. The controllers function to start and stop a motor, and to initiate a starting circuit and an accelerating timing circuit for the controller on the conveyor from which it receives its burden; that is, the next conveyor.

This sequencing circuit is new, differs in results from the conventional interlocking circuit used with conveyors and other devices operated in series, and has advantages not provided in other schemes.

CRAWLER CONTROLS – These controllers are enclosed in explosion-proof cabinets designed for mounting on the mobile transporters. Each controller provides automatic acceleration and is equipped with two two-pole reversing contactors, negative line contactor, accelerating contactor, overcurrent relay, starting resistor and *three* push-button control stations.

A control station is mounted on each side of the machine so that movement of the mobile transporter can be controlled from either side, and, in the forward direction, from the mining machine. Limit switches are provided to stop the forward or backward motion of the transporter and the extractor when the extensible conveyor on the transporter approaches its limit of travel in either direction.

CONTROL OPERATION

The control system for the conveyor drives is shown in Figure 6.

Item 1 covers the isolator. It is assumed that the positive, negative and ground conductors in the cable coupled to the left side of isolator are attached to a power source in the entry. The isolator control switch is now closed, bridging the contacts to which Conductors 1 and 2 are attached. Potential will now be applied in operating coils R1-R1 of relay R1 and cause its normally open contact R1 to close. This action energizes coil R2, causing its normally open contacts R2 and R2 to close. Closing of contacts R2 energizes coil M-1 and causes its main-line contact M-1 to close. Power is now available to all conveyor motors, including the conveyor on the mining machine.

It will be observed that the operating coil of relay R1 cannot be energized (1) if control switch on isolator cabinet is not closed; (2) if the contacts of any "stop" switch are operated; (3) if any plug and receptacle in the system is separated; (4) if the contacts of any overload (OL) relay are separated; (5) if conductor 14 is not connected to ground potential.

If the conveyors are not attached to the extractor electrically, an unusual condition, the ground connection is established by the insertion of the dummy plug, shown on controller 3, Fig. 6. It is apparent that coil M-1 cannot be energized, or its contacts closed, if R1 coils are not energized. This assures safe and proper operation.

If the normally closed contacts of the OL relay or contacts R3-b or R3-c separate, coils of relay R1 will be deenergized and cause coils R2 and M-1 to be deenergized also. The normally open contact of the OL relay will also close and energize, and maintain energized, the shunt coil (OL) of the overcurrent relay, and prevent reenergization of coils R1-R1.

Relay R3 functions–that is, its coil is energized–when conductor 15 or any device to which it is attached attains a potential above ground potential. When this coil is energized, its normally closed contacts R3-b and R3-c separate, causing coils M-1, R1, and R2 to be deenergized, causing power and control circuits to be interrupted, including conductors 15 and 14.

The normally open contact R3-a will also close, causing shunt coil (OL) of the overcurrent relay to be energized, and remain so. This action prevents the reenergization of coils M-1, R1, and R2, and isolates coil R-3. This action *completely isolates* all machines from potential above ground. Circuits to the master control panel *also* are isolated.

To reactivate the isolator and the circuits to which power is supplied, the isolator manually-operated switch is first returned to "off" and then placed in the "on" position.

The isolator, therefore, provides a means to isolate a circuit; (1) at will, (2) if excessive current flows in the main circuit or (3) *in any individual motor circuit*, (4) when a plug and receptacle is being separated, or (5) when conductor 15 or any device to which it is connected is above ground potential.

MASTER CONTROL PANEL– The controller for the conveyor that deposits its burden onto the entry conveyor is herein called the FIRST conveyor controller. The functions of the devices on the master control panel are to:

1. Cause the normally-closed main contacts of the accelerating contactor (T3) on the first conveyor controller to separate prior to the closing of the contacts of the line contactors supplying power to the motor driving the first conveyor.

2. Cause the main contacts of the accelerating relay, T3, to close and shunt the starting resistor associated with the first controller after a definite time has elapsed.

3. Cause the motors on the several conveyors to start in sequence–not simultaneously. Sequence starting avoids impressing high starting peaks on the power source and minimizes voltage sag.

4. Initiate a starting circuit that can be interrupted by an operator and/or by the stopping of the entry conveyor, and yet not cause the conveyors or other devices discharging to the entry conveyor to stop, and to permit the conveyor discharging to the entry conveyor, and each of the others, to operate until material is present at their discharge ends.

5. Permit all subsequent conveyors to operate until all conveyors are fully loaded. Visualize a series of conveyors operating and empty. The entry conveyor is, for some reason, stopped, but the portable conveyors and those on the transporter and extractor will continue to run until each conveyor is fully loaded. In other words, they stop in a sequence reverse to that in which they started. It is apparent that this feature eliminates many interruptions of mining and loss of production. All of the elements of production are not stopped every time the entry conveyor stops.

MASTER-CONTROLLER OPERATION–When the contacts of the

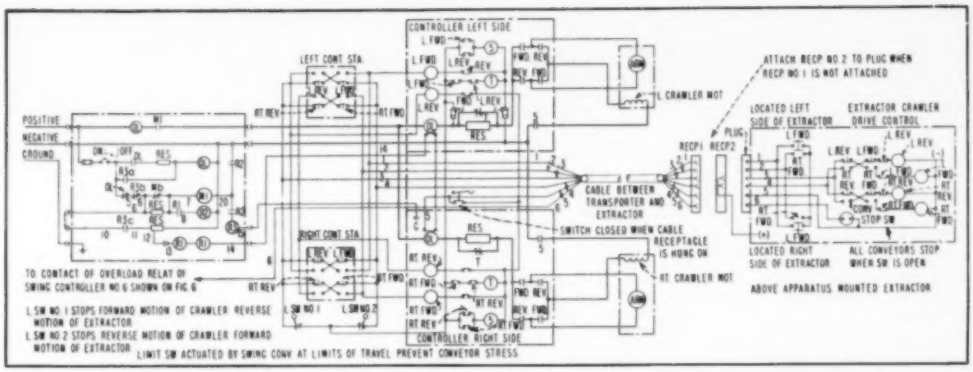

CONTROLLER LEFT SIDE
LEFT CONT STA
RIGHT CONT STA
CONTROLLER RIGHT SIDE
POSITIVE
NEGATIVE
GROUND
TO CONTACT OF OVERLOAD RELAY OF SWING CONTROLLER NO 6 SHOWN ON FIG 6
L SW NO 1 STOPS FORWARD MOTION OF CRAWLER REVERSE MOTION OF EXTRACTOR
L SW NO 2 STOPS REVERSE MOTION OF CRAWLER FORWARD MOTION OF EXTRACTOR
LIMIT SW ACTUATED BY SWING CONV AT LIMITS OF TRAVEL PREVENT CONVEYOR STRESS
ATTACH RECP NO 2 TO PLUG WHEN RECP NO 1 IS NOT ATTACHED
L CRAWLER MOT
R CRAWLER MOT
CABLE BETWEEN TRANSPORTER AND EXTRACTOR
SWITCH CLOSED WHEN CABLE RECEPTACLE IS HUNG ON
LOCATED LEFT SIDE OF EXTRACTOR
EXTRACTOR CRAWLER DRIVE CONTROL
LOCATED RIGHT SIDE OF EXTRACTOR
ALL CONVEYORS STOP WHEN SW IS OPEN
ABOVE APPARATUS MOUNTED EXTRACTOR

FIG. 7—SEPARATE CONTROLS for the crawlers of the mobile transporter permit independent operation of each crawler from either side of the transporter.

manually-operated master switch are closed, and the contacts of a switch close as a result of motion of the entry conveyor, the coil of timing relay T-1 will be energized (Fig. 6), current to coil T-1 flowing through normally closed contacts T2-b and R4-b.

When coil T-1 is energized, its normally open contact T1-2 will be closed, and its normally closed contact T1-b will be open. When contact T1-a is closed, the coil of timing relay T-2 will be energized. The normally open contacts T1-a and T2-c will now be closed, and normally closed contact T2-b will be open. Closure of contact T2-a will energize the operating coil of T3 in the controller in the first conveyor, and cause its normally closed contact T3 to open. Separation of contacts T2-b will cause coil T-1 to be deenergized. After a small interval of time contacts T1-a will open and deenergize coil T-2. Contact T1-b will now close and coil R4 will be energized through contacts T1-b and T2-c.

When relay R4 coil is energized its contact R4 closes and energizes coil M in the first conveyor controller, and power will be applied to the motor driving the first conveyor. When the coil of relay R4 is energized, its contact R2-a is also closed and provides a holding circuit for coil R4.

The normally closed contact R4-b in series with coil T-1 will be separated, and remain separated, as long as coil R4 is energized. Coil T-1 is obviously deenergized. As coil T2 has been deenergized by the opening of contact T1-a, after a lapse of time, its contacts T2-a and T2-c will open. When contact T2-a opens, coil T-3 in controller mounted on the first conveyor controller will be deenergized, and after a lapse of time the normally closed contact of the T-3 will close and shunt out the resistor in series with the motor driving the first conveyor.

Reference to the portion of the diagram pertaining to the master controller will disclose that after the energization of coil R4 the coils of timing relays cannot be reenergized until the contact R4-b is permitted to close. Coil R4 will be deenergized if the manually operated switches A, or conveyor operated switch B, are placed in the off position; if circuit to relay R1 (in isolator cabinet) is interrupted; or if the overcurrent relays (OL) or ground-protective relay operate.

When coil T-3 in the first controller, or any of the subsequent conveyor controllers is energized, contacts T3-b close. This action energizes coil T3 in the next conveyor controller, and so on. Therefore, voltage is applied to all accelerator contactor coils for considerable time, thus assuring that their iron circuit will be saturated, and also assuring that contacts T3, which shunt the starting resistor, will remain separated sufficiently long to permit the conveyor drive motors to attain appreciable speed.

CONVEYOR-CONTROLLER OPERATION—The conveyor controllers consist of one double-pole contactor, M2; an accelerating contactor, T3; overcurrent relay, OL; a stop switch; and a load switch.

As noted in the description of the master panel, the closing of contacts T2-a causes the operating coil of accelerating contactor T3 in the motor controller (No. 3) to be energized. This causes the normally closed contacts of the accelerator T3 to separate and insert resistance in the motor circuit. Coil T3 is energized long before contact R4 on the master panel is closed, assuring saturation of the iron of accelerator T3, and permits the conveyor motor to attain appreciable speed before the resistance in series with it is shunted.

When relay contact R4 closes, the coil for line contactor M in the motor controller is energized and voltage is impressed on the motor. After a short interval contact T2-a on the master panel opens and causes coil T3 to be deenergized. Shortly thereafter contact T3 closes and shunts out the starting resistor. Energizing coil T3 (in motor controllers) caused their normally open interlock T3-b to close and energize coil T3 in the controller next following.

After a lapse of time, as a result of opening of interlock T2-a in the master panel, coil T3 on No. 3 controller will be deenergized and contact T3-b will separate and start the timing cycle for the next controller. Contact T3-b will close after a proper lapse of time when its coil T3 is deenergized, and energize the line contactor of the next controller, providing interlock M-a is closed. Contact M-a is closed when main power contacts M-2 are closed.

This procedure continues until all the conveyors are in operation. It will require approximately 40 sec to start 20 conveyors in tandem.

It will be observed that when line contactor M2 closed, interlock M-a actuated by contactor M2 must be closed before the line contactor M-2 in the next controller will close and thus assure proper sequence starting.

Closure of the M contactor also causes interlock M-b to close, and provides an independent source of energy for the operating coil of contactor M through the load limit switch. If contact R4 in the master panel is opened, as a result of stopping of the entry conveyor, coil M will remain energized until the load switch is biased to the open position by the

presence of material at the discharge end of each conveyor. Conversely, so long as the entry conveyor is running, contact R4 will be closed, and the opening of the load switch therefore will not stop the conveyor.

The controller for the extractor conveyor is identical to that used on the other conveyors, except that interlocks T3-a, T3-b, and M-a are omitted. These are not required, since it is the last conveyor to start.

The rotary stop switches on the conveyors and elsewhere, and the contacts for the overload in each controller, are connected in series in conductor 14. Should any of the contacts in this conductor—*including* those in the *plugs* and *receptacles*—be separated, the coils of relay R1 will be deenergized, and contactor M-1 in the isolator will open and disconnect power from all of the apparatus receiving power. Power cannot be reimpressed on the apparatus until this circuit is reestablished.

The overload relays in the controllers lock in the open position when their contacts separate as a result of flow of abnormal current. Manual reset is provided. The individual OL relays are adjusted to a value that protects each motor from the effects of overload, or a short in the motor or its control. The contactor in the isolator opens the circuit, releasing the contactors in the controllers from the damaging effects of opening a short circuit or overload.

The goal in the foregoing has been meeting all requirements with a minimum apparatus, all of which is time-tried. Operations can be carried on without the need for conversation and signals between the receiving and discharge end of the transportation system. There also are many features that are new and very desirable.

CRAWLER CONTROL—The control for the crawlers of the mobile transporter (Fig. 7) consists of a section isolator identical to the isolator used with the controller for the conveyor drive motors. A master panel is not used or required. As each of the two crawlers is driven by a separate motor, and each motor is separately controlled, two controllers are required. A control cabinet is provided for each, one being mounted on each side of the transporter.

A control station, consisting of four momentary-contact switches, is provided on each side of the conveyor. This permits each crawler to be independently controlled in either direction from either side of the transporter. The control switches are so located on the control station that confusion in the operator's mind as to which switch to operate to effect the desired direction of crawler movement is avoided.

Two additional control stations are provided. One is mounted on one side of the extractor; the other on the other. Manipulation of either switch will cause the crawlers to operate in the forward direction.

Two limit switches are provided to stop the backward or forward movement of the transporter. These limit switches prevent the operator from placing undue stress on the extensible conveyor by overtraveling the transporter in either direction. A circuit also is provided that will prevent the extractor from advancing beyond the extensible-conveyor limit.

The isolator provides a means of isolating all electrical circuits and apparatus from the source of power at the will of the extractor operator, at the transporter, or in the entry where the isolator is located. It will isolate:

1. All circuits when the control plugs and receptacles associated with the system are being separated.
2. All circuits and apparatus if excessive current flows (short circuit).
3. All apparatus or machines from the source of power if their frames are above ground potential.
4. All apparatus if transporter structure is above ground potential.

Each controller consists of two two-pole directional contactors, a line contactor, an accelerating contactor, overload relay and necessary starting resistor. When control switch contacts are closed, a directional and negative line contactor will close and apply power to the motor.

Closure of the line contactor will interrupt the circuit to the accelerating contactor operating coil. After a lapse of approximately 2 sec, the normally closed contacts will close, shunt the starting resistor and apply full voltage to the motor.

As stated, the direction of crawler travel can be selected and controlled from either side of the transporter. Motion of the crawlers continues only while control switches are held in closed position.

COUPLED OPERATION—In the description of the operation of the control for the transporter traction motors, it was stated that forward motion of the transporter could be controlled from the extractor; also that limit switches would stop the forward or backward motion of the crawler motors when the extensible conveyor had reached the limits of its forward or rearward motion.

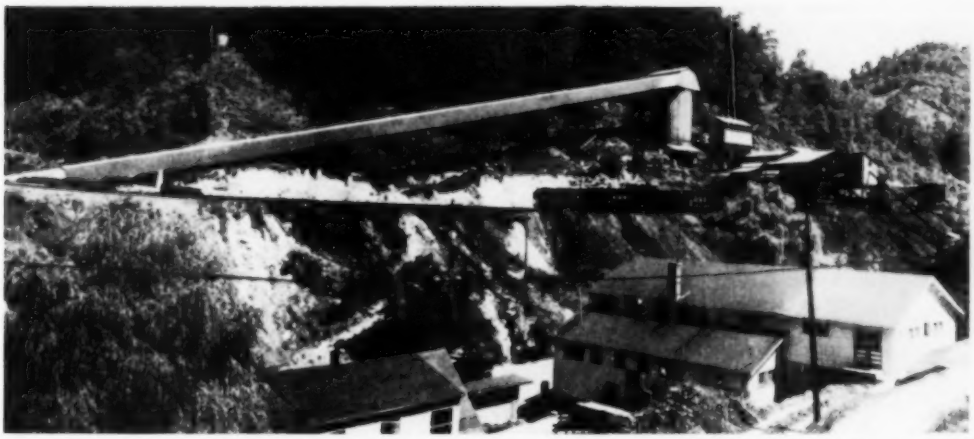
As the extensible conveyor usually is coupled to the extractor; and the extractor also moves forward and backward, some means is required to limit its travel either forward or backward when the extensible conveyor is fully advanced or retracted. Study of the connection diagram (Fig. 6) will disclose that the same limit switches that limit the motion of the transporter also will limit the forward and rearward motion of the extractor. To meet these requirements, a cable containing the control conductors between the reversing controllers on the transporter and the extractor is used. Obviously, when the extractor and transporter are not coupled, it should be possible to move either one of them in any direction.

When operating with the transporter and extractor coupled, a receptacle, No. 1, is attached to the cable previously mentioned. When the extractor is coupled to the extensible conveyor of the transporter, receptacle No. 1 is inserted in the plug on the extractor. When the transporter is not connected to the extractor, receptacle No. 2, attached to the extractor, is inserted in the plug on the extractor. When it is so placed, the extractor may be traversed.

When receptacle No. 1 is removed from the plug on the extractor, it is hung on a hook-operated switch on the transporter. Closing of the contacts of this switch provides contact with the negative side of the line, which was interrupted when contact 5 in receptacle No. 1 was separating from contact 5 in the plug. When receptacle No. 1 is hung on the hook-operated switch, the transporter may be traversed in any direction, irrespective of whether or not it is attached to the extractor.

It is to be understood that contact 6 in plug No. 1 is to be shorter than the other contacts, and separate prior to the separation of the other contacts. The voltage and current carried on conductor 6 is very low, limiting the arc formed to a safe value, and assuring that no current will be flowing when the others separate.

The statements just made do not apply when receptacle No. 2 is being removed from the plug, unless the builder of the extractor incorporates in his power supply a room-power isolator or equivalent. It can be said that the possibility of someone attempting to withdraw the receptacle while the extractor is being traversed is unlikely. The principle reason for using the room-power isolator is its ability to isolate the power and control conductors, as well as the controllers and motors, from the source of power in case of short circuit, and to isolate the extractor if its frame attains a potential slightly above ground.



SPLASHDAM COAL from the new mine is transported from an underground storage bin on this new belt conveyor to the recently constructed 450-ton storage silo at the tipple.

New Slope Taps 50 Million Tons

Opened to replace present Clintwood-seam operation on depletion, new Roseann mine uses track, belts and chains to develop 20,000 acres of Splashdam seam. Mine-built conveyor drive reduces belt cost.

NEW CONSTRUCTION recently completed at Roseann mine of the Panther Coal Co., Inc., Roseann, Va., will put the company in position to mine 50,000,000 tons of Splashdam coal after its Clintwood seam, opened in 1934, has been worked out in 7 or 8 yr. Coal from the new mine, planned for track main haulage and belt section haulage, is transported by belt conveyor from an underground car-dump hopper to a 450-ton storage silo. To reduce the cost of this belt conveyor, the Leckie organization designed and manufactured a new type belt-drive which permits use of a lower cost belt for this heavy duty assignment.

Roseann, one of the several coal mining properties headed by W. S. Leckie, is in Buchanan County, Virginia, a field first developed in 1932 (*Coal Age*, August, 1934). One of the earliest in the field, the mine was opened in the Clintwood seam which outcrops 476 ft above the railroad at an elevation 1,954 ft above sea level. The steel tipple, built by Jeffrey Mfg. Co., and the 350-tph American Steel & Wire continuous-type aerial tram still are in operation. Five Belknap calcium-chloride washers have been added to the preparation plant at various times. Four are used for primary washing of 5x3, 3x2, 2x1¾ and ¾x¼ raw coal, while the fifth, a two-compartment unit, retreats 5x2 middlings from the others in one compartment and 2x¼ in the other.

The Splashdam seam, 20,000 acres of which are under lease, lies approximately level and at the tipple site is 20 ft beneath the railroad tracks. Seam thickness, ranging from 26 to 44 in. averages 32 in. The coal, containing approximately 29% volatile matter, is suitable for steam, domestic and by-product uses.

BELT INSTALLED IN SLOPE

Coal from an underground hopper is conveyed 659 ft horizontally and elevated 161 ft vertically by a 42-in belt conveyor, on 679-ft centers, to a storage silo on the hillside above the tipple. A mine-car dumping rate of 10 tpm was the basis for belt-conveyor selection. A concrete-lined tunnel houses 278 ft of the conveyor, with the remainder in a wooden gallery supported by wood towers. The tunnel slopes are 7 deg 43 min, 10 deg 48 min and 15 deg 9 min; slope of the wooden gallery is 15 deg 9 min.

The belt, supplied by the United States Rubber Co., is U. S. Giant unit, 5-ply 36-oz duck, with ⅛-in top cover and breaker strip and 1/16-in bottom cover. Past practice would have called for a belt of greater strength, but reduction of peak tension by installing a special drive to permit smooth starting made it possible to use the lighter belt. This special drive was designed and manufactured in the Leckie shop.

NEW BELT DRIVE DESIGNED

The belt drive, located in a 30x30-ft building on top of the silo, consists of a 100-hp 1,770-rpm 220-v Reliance motor transmitting power through a Twin-Disc hydraulic coupling (Type 145-HC-13), a 15:1 ratio Cone-Drive reducer and a special compact double-sprocket roller chain designed to reduce noise and shock. The chain operates in a dust- and oiltight metal housing.

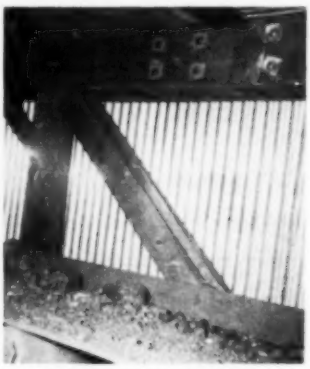
Pressure lubrication and water cooling are featured in the Cone-Drive reducer. A pump connected directly to the side circulates oil at 50 psi to all bearings and gears. A water pump, connected to extended shaft of the 100-hp motor, circulates water through coils in the Cone-Drive and through a radiator at the opposite end of the motor. The radiator is cooled by the fan of the 100-hp motor.

Dodge Taper-Lock drive pulleys, 36 in in diameter with 44-in faces, are mounted on Dodge-Timken pillow-block bearings. Sealed-bearing-type idlers, supplied by Huwood-Irwin, are used for carrying the belt. Drive pul-

RECIPROCATING FEEDER under 40-ton underground bin feeds coal to slope belt conveyor.

CONCRETE STAVE SILO holds 450 tons of Splashdam coal. Aerial tram at right brings Clintwood coal to tipple.

CONVEYOR GALLERY, framed from western fir and assembled with split-ring connectors, supports the 42-in slope belt. Coal is elevated at a 15-deg angle.



SPLIT-RING CONNECTORS splice two 3x12-in conveyor gallery timbers.

Conveyor design avoids priority complications.

leys operating at 44 rpm produce a belt speed of 415 fpm.

Cleaning sticky fine coal from the belt is accomplished by a piano wire stretched close to the belt surface on the return side near the head pulley (p 89 of this issue). Reciprocating feeders, driven by Reliance 7½-hp motors transmitting through Dodge Torque-Arm reducers, are located at the underground hopper and at the bottom of the storage silo.

Electrical controls for the installation will be revised at a later date to make the operation fully automatic from the time the coal is dumped from the drop-bottom mine cars into the underground hopper to its final storage in the 450-ton silo.

WOOD PREVENTS DELAY

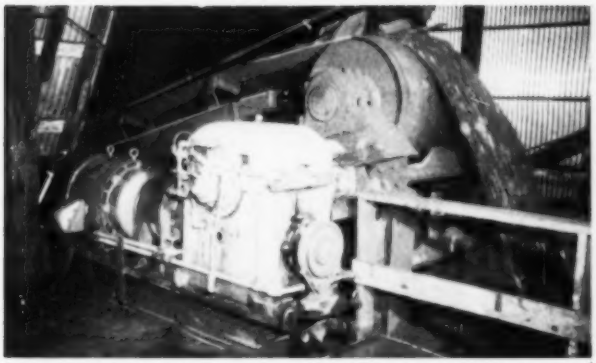
The principal reason for using wood for the conveyor gallery and tower bents was to avoid the delay and priority complications involved in using steel. Creosote pressure-treated western fir framing was assembled with split-ring connectors made by the Timber Engineering Co. The longest span between bents is 80 ft. Trusses were built on the ground and then hoisted to the tower bents. Top and bottom chords on each side consist of two 3x12-in stringers spliced together as necessary with the ring connectors. Side and upright braces are 4x6-in timbers. Split-ring connectors have proved so effective that camber built in the trusses to allow for sag has not come out.

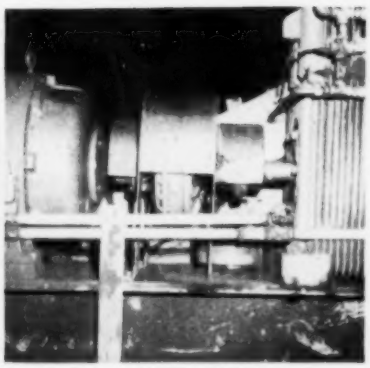
SILO STORES COAL

The 450-ton concrete-stave silo, 30 ft in diameter and 40 ft high, was constructed by Neff & Fry. The bottom of the silo is bed rock cut in steps to the approximate natural slope of the hill. On this, the coal makes its own bottom and assumes the angle of repose. Since degradation is not a problem it was not necessary to install a spiral or lowering device. Coal is fed out by a reciprocating feeder 17 ft below the bottom of the staves and carried into the tipple by a 30-in self-supporting belt conveyor 40 ft long. This belt conveyor also was designed by the coal company.

At present both mines are operated two shifts, but coal from the Splashdam seam is not mixed with that mined from the Clintwood. Tipple operation is on a two-shift basis, with coal from each seam being alternately processed for several hours. Later, when the Clintwood mine is nearer depletion and its operation is cut to one shift, it is planned to store the Splashdam coal while the Clintwood coal is being washed on the same shift it is produced.

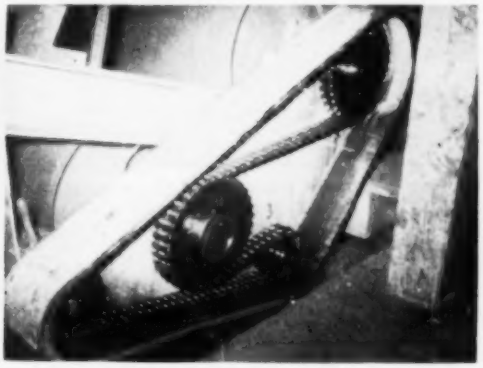
It is difficult to classify the Splashdam operation as any one type because of the variety of openings. Belt haulage from the underground hopper





NEW DRIVING UNIT designed to reduce belt cost includes radiator, water pump, motor, hydraulic coupling and reducer with oil pump (left photo). Fluid coupling permitting smooth starting is partially exposed under the guard (right).

BELT DRIVE UNIT showing drive pulleys and chain drive. Motor and auxiliaries are on opposite side of the unit.



SPECIAL ROLLER CHAIN AND SPROCKET arrangement. Oil- and dust-tight housing normally covers mechanism.

Lower cost belt feasible with smoother starting drive.

to the tipple is through a slope. A second opening nearby is a drift through the side of a railroad-track fill, from which a mine track is to be extended to a rock dump hopper where disposal trucks will be loaded. This track will continue over a bridge crossing the highway and creek to connect with a materials-storage yard. A third opening, an air shaft, is near the other two.

MINING WELL PLANNED

At the time this article was prepared, a 6-heading main entry had been developed 1,600 ft, using belt transportation to the underground hopper. Bottom had been lifted for 1,000 ft on the projected haulway (No. 2 heading) to provide a minimum height of 72 in. Three of the new 10-ton 4-wheel 6-door ACF drop-bottom cars were on hand for main haulage.

Mining plans call for 2,000-ft panel belts delivering to mine cars and Joy 12-BU loaders with Piggybacks loading into chain conveyors in the rooms. Rooms will be driven 50 ft wide and the top held by roof bolts in combination with a considerable quantity of timbering and a few cribs.

Present equipment consists of 3 Joy 12-BU loaders, 6 Piggyback conveyors made by the Long Super Mine Car Co., 2 Jeffrey 35 BB undercutters, 6 Joy 11-B undercutters and 4 Chicago Pneumatic Type RBD-30 electrically operated mobile roof-bolting units. The bolts, furnished by the West Virginia Steel & Mfg. Co., and now being installed in entry development, are 24 and 36 in long with expansion-shell anchors. In developing the 6-heading entry, a Joy loader serves two headings while a Piggyback conveyor is installed in each entry.

Design, engineering and construction at the new operation were handled by the staff of the Leckie organization, with headquarters at the Bluefield, W. Va., office. Joe Wantling, maintenance superintendent, was responsible for the mechanical design of the reciprocating feeders and the belt conveyor, including its special drive. W. W. Coleman, mining engineer, and B. A. Watts, his assistant, worked out the layout and handled design details of the wooden trusses and tower bents. E. F. Talbott, superintendent at Roseann, designed and supervised the arcweld fabrication of the tubular structure supporting the 30-in conveyor bridging from the silo to the tipple. W. H. Leckie, of Bluefield, is general manager and Fred D. Leckie, also of Bluefield, is general superintendent. Both are sons of W. S. Leckie, president of the Panther Coal Co., Inc., and of the Leckie coal mining interests, including: Borderland Collieries Co., Leckie Collieries Co., Logan-Eagle Coal Corp., Leckie Smokeless Coal Co. and Panther Coal Co. of West Virginia.

SPARE SECTIONS RATHER THAN moving spare machines to the face, TCI keeps two working sections available for use of production crews while special maintenance crews (above) take over their regular equipment for scheduled periodic inspection and repair.

Preventive Maintenance Adds Productive Time at TCI

PROBLEM: Establishing uniform production at minimum cost

SOLUTION: Spare working sections and special maintenance crews, plus section repairmen and underground shop

ADVANTAGES: Fewer major breakdowns, increased production, lower maintenance cost

PROGRESSIVE PREVENTIVE MAINTENANCE is the answer Tennessee Coal, Iron & R.R. Co., Birmingham, Ala., has developed to the problem of establishing uniform production at minimum cost. Key to the program at TCI's Concord mine is the rotation of loading crews to spare sections equipped with machinery in top operating condition while theirs is undergoing periodic inspection and repairs. The system was founded on the basis that it is easier and more economical to move men than equipment.

Management conceived the idea that spare working sections, completely equipped, would save breakdowns and permit a system of preventive maintenance to function smoothly.

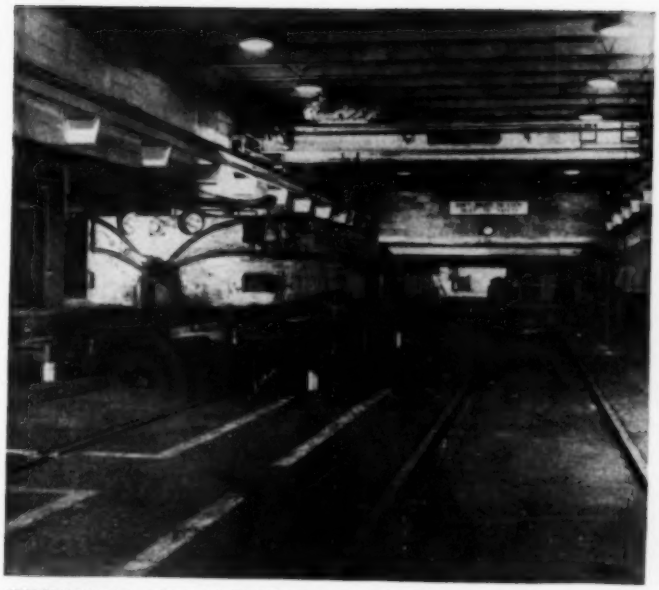
Production crews are shifted to a spare section for several days while their regular equipment is being inspected and restored to top operating condition. They then return to their regular sections.

While it is difficult to pinpoint exact savings effected by the program because of expanding operations, it is known that section production has increased. Other results of the program are less downtime, savings in material and parts and lower equipment repair costs.

There are two spare or maintenance sections and 14 mining sections. Special maintenance crews service each section every 4 to 5 working weeks, spending 2 or 3 days on each, repairing section equipment.

MAINTENANCE SCHEDULED

Maintenance work is scheduled well in advance and all section personnel are given notice when a maintenance crew is to take over. The production crew is moved to one of the spare sections where it has at its disposal equipment in top operating condition while its regular equipment is being serviced. When the maintenance job is completed, the production crew returns to its regular section and the maintenance crew moves to another production section whose crew then goes to a spare section.



UNDERGROUND REPAIR SHOP WITH FACILITIES to retruck locomotives and perform jobs that cannot be done in the section, shop features hydraulic floor lift, overhead crane, good lighting and ample work space.

SECTION REPAIRMAN MAINTENANCE MAN in each section handles day-to-day inspection, repair and lubrication, works with special 6-man crew when it moves in.

SPECIAL MAINTENANCE CREWS

Four 6-man maintenance crews plus the section repairman, who always remains with his section equipment, perform the preventive maintenance work. Two crews work on the day shift and two on the night shift. Duties of the special maintenance crew are to change oil, inspect bearings and replace when necessary, inspect and repair moving parts, make minor repairs and adjustments, and replace unit assemblies as needed. All major overhauls on machines and rebuilding of unit assemblies are done in the main repair shop above ground. Some of the routine work underground consists of removing wheels, inspecting bearings, brakes and hydraulic lines; remaking cable splices; replacing gear assemblies, chains and motors when necessary; inspecting and replacing flights on shuttle cars, and loader chains; reworking controls.

Each producing section, operating three shifts per day and 5 days per week, has a section repairman assigned to each shift. Duties of the repairman are to inspect and lubricate equipment, and make minor repairs and adjustments. These routine jobs are performed during the shift when the equipment is idle or when trouble is indicated.

SECTION PROCEDURE

Should the section repairman see a machine which, in his opinion, is not operating properly or is developing trouble, he immediately takes steps to stop the machine and make adjustments or repairs. TCI does not permit equipment to continue operating when such repairs are needed. Minor adjustments or repairs save major overhauls later, TCI management declares.

Section equipment under the section mechanic consists of a gathering locomotive, cutting machine, crawler-mounted loading machine, two cable-reel shuttle cars, mobile air compressor, elevating conveyor, car spotter, hand-held coal drill, stoper roof drill and impact wrench.

When a major breakdown occurs or a unit assembly needs to be replaced on any of the equipment, the section repairman first calls the main shop and reports the trouble, and then returns to the equipment to begin removing the assembly or parts. Considerable time is saved and the equipment is returned to production quickly by following this procedure.

KEY MAINTENANCE POINTS

Present experience indicates that bearings in gathering arms of loading machines should be inspected, cleaned and repacked each time the maintenance crew visits a section. In addition, it is advisable to flush out and adjust the gathering heads. All clutch settings should be checked and adjusted if necessary and special attention given to hydraulic systems.

Wearing strips on Joy loaders are now being hard-surfaced and tests are being made on similar-type surfacing for other equipment parts subject to unusually heavy wear or abrasive action. Results have been good and considerable savings effected in parts replacement.

UNDERGROUND SHOP

A spacious and well-equipped underground repair and maintenance shop is available at Concord mine for minor repairs on locomotives and other equipment. Retrucking and replacement of unit assemblies of locomotives is done here. An electric steam cleaner is a time-saving and

UNDERGROUND SUPPLY ROOM permits speedy replacement of main motors, unit assemblies, cables and quick-moving parts.

ELECTRIC-STEAM CLEANER, underground shop tool, saves inspection and repair time.

Lubrication Specifications—Concord Mine

AIR COMPRESSOR—ACME	
Crank case	750 pale oil
Traction speed reducer	TCI cyl. oil
Differential	TCI cyl. oil
Pressure-gun fittings	Starfak L
Steering gear & wheels	Starfak L
AIR COMPRESSORS—JOY	
Crank case	750 pale oil
Traction speed reducers	750 pale oil
Pressure-gun fittings	Starfak L
AIR COMPRESSORS—GENERAL	
Crank case & oil bearings	750 pale oil
Pressure-gun fittings	Starfak L
CAR SPOTTERS	
Exposed gears	Waste oil
Pressure-gun fittings	Starfak L
COAL DRILLS	Starfak L
COUPLINGS	
Falk	No. 3 Marfak
Fast	No. 1 Crater Comp.
CUTTING MACHINES—JOY 10 & 11-RU	
Cutter-head gearing	TCI cyl. oil
Boom-roll gearing	TCI cyl. oil
Transmission case	TCI cyl. oil
Bushings for outer boom	TCI cyl. oil
Pressure-gun fittings	Starfak L
Open gears & chains	Waste oil
Hydraulic system	300 pale oil
CUTTING MACHINES—JEFFREY 70 URB	
Cutter-head gearing	TCI cyl. oil
Turn-over gearing	TCI cyl. oil
Transmission case	TCI cyl. oil
Pressure-gun fittings	Starfak L
Open gears & chains	Waste oil
Hydraulic system	300 pale oil
CUTTING OILS	Soluble—D and water
ELEVATING CONVEYORS	
Speed reducer	750 pale oil
Pressure-gun fittings	Starfak L
Wheel bearings	Starfak L
Chains	Waste oil
LOADING MACHINES—JOY	
Gathering-head gear case	TCI cyl. oil
Gathering-head trans.	750 pale oil
Crawler-drive gearing	TCI cyl. oil
Hydraulic system	300 pale oil
Chains	Waste oil
Pump-motor speed reducer	750 pale oil
Pressure-gun fittings	Starfak L
LOCOMOTIVES	
Waste-packed bearings	750 pale oil
Gear cases	TCI cyl. oil
Pressure-gun fittings	Starfak L
Hydraulic system	300 pale oil
MINE CARS	H. grease No. 1
PUMPS	
Gear cases	TCI cyl. oil
Oiled bearings	750 pale oil
Pressure-gun fittings	Starfak L
RECTIFIER PUMPS & FANS	
Grease bearings	Starfak L
Oil bearings	300 pale oil
ROCK DUSTERS	
Speed reducers	750 pale oil
Pressure-gun fittings	Starfak L
SHUTTLE CARS—JOY	
Wheel units	TCI cyl. oil
Speed reducers	750 pale oil
Pressure-gun fittings	Starfak L
Hydraulic system	300 pale oil
Chains	Waste oil
SPEED REDUCERS—GEN. PURPOSE	
Worm	TCI cyl. oil
Spur	750 pale oil
Helical	750 pale oil
Herringbone	750 pale oil

(Note: Large speed reducers are covered by special lubrication instructions.)

NOTE: 300 Pale oil, approximately SAE 20, replaces SAE 30, SAE 20 and Regal E Oil in hydraulic systems. TCI cylinder oil, approximately SAE 90, replaces SAE 70 oil and SAE 90 gear lubricant. 70 Pale oil, approximately SAE 40, replaces SAE 30 in gear cases.

valuable tool used in cleaning and inspecting parts. Quick repair of equipment, made possible by use of the underground machine shop; has resulted in savings in time and money.

LUBRICATION SIMPLIFIED

Lubrication has been the subject of careful study and tests by TCI engineers. As a result, only three types of lubricants are used, as against five previously. Reducing the type to three has simplified purchasing and storage problems as well as use. Identification of lubricant is made easy by painting each drum a color to correspond with a color code for type of lubricant.

Lubricants are requisitioned by the foreman in accordance with a specification chart. Equipment operators, under the supervision and with the assistance of section repairmen, lubricate all mobile equipment, other than motors, which is performed by the section repairmen. Good housekeeping is practiced wherever lubricants are handled. To permit easy control and as a safety precaution, all supplies are stored in a concrete-block room, with a steel door.

To date, TCI has not adopted a time schedule for major overhauls because most of the equipment has not been in service a sufficient time to determine its service life. However, a major overhaul once a year is now indicated. Management feels that such a program is preventive, rather than necessary, and will result in better operating efficiency. The whole plan is aimed at avoiding major breakdowns at a time when maximum production is desired most.

When a major overhaul is scheduled, the equipment is taken out of service and sent to the outside main repair shop where facilities are available to perform expert repair work.

Its preventive maintenance program is a continuing one, TCI management reports, and changes are to be made as additional knowledge is gained from experience.

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DUNLAP WELDING & SUPPLY CO. Zanesville, Ohio
QUAKER SALES CORP. Johnstown, Pa.
PERSINGER SUPPLY CO., INC. Williamson, W. Va.
PERSINGERS INCORPORATED, Charleston 27, W. Va.
UNION SUPPLY CO., Denver 2, Colo.

Foremen's Forum

JOHNNY MIZE uses a big bat and a lot of experience to slam one homer, but . . .

—*Wide World Photos*

CARL FURILLO in the clutch calls upon his training to rob Mize of another.

Under Pressure; or . . .

Why baseball is the national pastime

Straining to make a point, we offer the 1952 World Series as a source of lessons on (1) the value of experience, (2) the value of training, (3) how to handle new men and (4) how to overcome mistakes.

THIS IS THE MORNING AFTER the seventh and last game of the Yankee-Dodger World Series, a stirring brawl if ever there was one. Since for the past week the Series has prevented us from observing the noiseless tenor of our ways, we thought it only prudent to try to salvage some of the editorial time consumed in hoping, wishing, perspiring and silent rooting—for the Yankees, of course. Ergo, this piece on lessons to be learned from watching one group of men apply hickory to a stuffed piece of the outer covering of a horse's backside and another group stifle their efforts by trapping the ball in various sectors of the playing plot. (The remainder of this manuscript will be typewritten with one hand. Certain uninhibited Dodger fans, reading the above Yankee reference over the writer's shoulder, pounded the knuckles of his left hand into uselessness with a 1939 issue of the *Keystone Coal Buyers Manual*.)

As the Series unfolded, we were set to wondering about what it is that makes baseball our National Pastime. We conclude the annual frenzy is a result of the game's being such a close parallel to our American methods of living. We prepare for battle, we compete and the winner picks up the marbles. And there will be other scrambled metaphors before this is finished.

Now for the lessons the World Series teaches.

THE VALUE OF EXPERIENCE

Came the fourth game and Mr. Stengel surveyed the carnage. The Dodgers were leading two games to one and Mr. Black of the Brooklyns was again staring down Yankee throats. Looking for help down the thin gray line on the bench, Casey's eyes came to rest upon the intriguing form of the so-called "aging and decrepit" John Mize. (The foregoing staging is pure fantasy, of course.)

"Play first base," said Casey. "Sure,"

B.F.Goodrich

Ira Zeigler, truck driver for Pittshaw Trucking Co. examines the tread of a BFG Rock tire on his semi-trailer.

"Better than any tires we've ever used," says coal hauler about BFG tires

THE Pittshaw Trucking Co. hauls coal from strip mines near Kittanning, Pa., to loading tipples eighteen miles away. Sixty-seven company trucks, tractors and trailers cover the distance under giant loads of coal—over rough, rock-strewn roads and often over no roads at all.

Here, certainly, is a chance for off-the-road tires to prove they can take rugged operating conditions and still give positive traction and long wear. "Without doubt," says Pittshaw Supt. Richard McGarvey, "B. F. Goodrich tires have proven to be better than any tires we have ever used." This is why Pittshaw's units are 98% equipped with BFG tires.

The Rock tires above, for example, are used on semi-trailers carrying extra-heavy loads. Husky cleats in the shoulders of these tires take non-slip bites in both forward and reverse. Wide center ribs broaden surface contact, lengthen tread life. And Rock tires, like all other B. F. Goodrich off-the-road tires, are built with the exclusive nylon shock shield. Layers of strong, elastic nylon cords stretch together under impact to absorb and distribute shocks and bruises, protect the tire body. You get this 4-way saving:

(1) more recappable tires and more hours of service per recap (2) more original hours of service (3) increased bruise resistance (4) less danger of tread separation. All these advantages, yet the nylon shock shield costs you nothing extra. It's found in all tires of 8 or more plies—*double* nylon shock shield in larger sizes.

There's a B. F. Goodrich tire and tread to meet every off-the-road requirement. Pittshaw Trucking uses 5 different types. See the complete line of cost-cutting tires at your BFG retailer's store. You'll find the address under Tires in the Yellow Pages of your phone book. *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

said Johnny Mize, and shortly thereafter hearts were aching all along Flatbush Ave. Mize, who had seen all this before, took over the proceedings with the authority that comes from experience. In assisting Allie Reynolds, another exponent of the value of experience, the Big Cat landed one in the seats, and that was all that was really needed since Reynolds pitched a shut-out. Black was the victim but he had nothing to be ashamed of. He had helped immeasurably in getting the Dodgers into the Series and had hobbled the Yanks for a first-game Dodger victory. But the point is: Assimilated experience sooner or later turns into class, as Mize demonstrated in the fourth game and on later occasions.

THE VALUE OF TRAINING

If you have ever been a member of a first-aid team, you will agree, we think, that constant practice may become boresome. After a certain number of training sessions, one is led to wonder why all this repetition is necessary. Isn't it enough to know what to do, then proceed to do these things in the big contest? Let's return to the ball parks for the answer.

Struggling to stick to the mining theme, we assert there has never been a picket line like the Dodger outfield in this Series, with Shuba going to his left like the wind to gather in a screaming line drive and the others, Furillo, Pafko and Snider, going straight up to wrestle Gabriel for potential home-run balls off Yankee bats. It was picketing at its best. In these sensational catches, luck is a minor factor. The skill that comes from endless practice is the big thing.

We would estimate that over the course of a full season, each of these men took out after a few thousand fly balls, including those in Spring training, pre-game fungo drills and the actual games. After such constant practice, an outfielder acquires the habit of instantaneously reacting to the "thwock" of the bat against the ball. In a trice the job is done, if the fly is catchable.

Merely knowing what to do is not enough. The fast reaction which is triggered by the situation can only result from constant practice—like learning to tie a square-knot in a cravat bandage every time without too much mental effort.

Furthermore, the value of training showed up in the fielding of PeeWee Reese and Billy Cox throughout the Series, and in the way Phil Rizzuto in the first game strip-mined a considerable area around second base to dig a low throw out of the earth and tag an incoming runner.

HANDLING NEW MEN

Mantle, Loes, Black and Erskine, while not raw rookies, took their baptism of fire in this one.

Take Mickey's case. Throughout the season, Mantle swung on a lot of two-strike counts where the ball should have been, but wasn't. All indicators point to the fact that his boss sometime in late August took him aside and said, "See here, Boy, you'll get no rest. You'll play centerfield and take your turn at the plate until you find yourself." Shortly thereafter Mantle found himself, and baseball people not wearing the uniform of the Yankees rued the day. You know what he did in the Series. The moral is: If your new man has great potentialities, give him more than a fair trial.

Take Billy Loes. He's a darn good pitcher and an asset to the Dodgers. With the heat on in the sixth game, the ball squirted out of Bill's hand during his windup, thus sending a runner to second on the balk. Raschi then bounced one off Billy's leg into right field and the jig was up. Dressen stuck with him but the Yanks had it sewed up. There are those who will say Dressen stuck with him too long, but Loes will be a better man for it. In Brooklyn, there's always next year.

Joe Black is the least raw of all the rookies. He's been around a long time. When you have a fellow like this, you let him operate. When he loses, you know you had nothing better to offer anyway.

Now, Erskine. They say Branch Rickey (wonder what he can do for the Bucs?), as a Brooklyn official, journeyed to Montreal a number of times to watch Erskine pitch. On every occasion Erskine pitched a good game and won a lot of close ones. But Rickey never brought him back to Brooklyn until he had seen him suffer through a bad inning and come from behind to win. Erskine's coolness under pressure paid off in the fifth game when the Yanks scored five in one inning. Dressen bet on that coolness and Erskine mowed down the next 19 men in order to take the game that put the Dodgers one victory away from the laurels. The lesson: When a fellow proves his mettle once, you can go all the way with him again.

OVERCOMING MISTAKES

In the third game, a pitch got away from Yogi Berra, the Yankee catcher, and two runs scored to provide the winning margin. Even the best get into situations like this. A finger on Berra's mitt hand was split by the pitch, but the next day he was back on deck with the splintered member exposed to the weather. He caught the remainder of the Series in his usual accomplished manner and contributed a homer among other solid hits.

Gil Hodges, Brooklyn's first baseman had no hits in 21 times at bat. The hard-hearted will elect him goat of the Series, but that isn't nice. Hodges big bat during the season produced 32 home runs and over 100 runs-batted-in. Without this contribution, the Dodgers would have had to buy tickets if they wanted to see the World Series.

Sure, you'll have bad days. Berra had a horrid one and Hodges had seven in a row, but they'll be back next year.

To the fellows who play the game for money, baseball is a job with all the compensation and frustration common to other jobs. There is one saving feature in your job and mine. We don't work under the scrutiny of thousands of bloodthirsty fanatics.

But these partisans of the Trolley Dodgers, peering over my shoulder, are not exactly docile, and we know your superior has his hawklike gaze fixed upon you. Come to think of it, we don't need thousands of them, do we?

We realize that by the time this reaches you the Series will be month-old history, but we hope that in reading it you can recapture the peak of interest we feel this Wednesday morning. Anyway, a hot classic like the '52 Series is timeless.

Attention, Please: Master Mechanics and Chief Electricians . . .

In a recent letter from England, W. J. Clampitt, a mine mechanic, writes us as follows:

"Have obtained a copy of Coal Age which, although dated January, 1951, is full of interesting . . . happenings in the coal industry, and it is because of its obvious widespread publication that I am writing to you. I am employed as an underground colliery fitter, which means I have to maintain cutters, belts, engines and so on in my district at the pit. I have been thinking that it would be a good thing if I could correspond with a fitter in a coal mine in the U. S. A. Maybe someone would be keen on the idea, as the interchange of news and magazines would, from my point of view, help, though in . . . minute form, Anglo-American friendship. I am 23, been in the colliery 4 years after 3 years of Air Force service.

"If through you my request for a correspondent is accepted I should be very grateful. And as a matter of interest, the copy of Coal Age which I possess is marvelous . . . I am hanging on to it."

We deeply appreciate Mr. Clampitt's interest in our paper. May we suggest that if you or one of your mechanics or electricians wishes to take up his offer, you write him at: 33 Airstone Road, Askern, Near Doncaster, Yorkshire, England.

Autumn Reminder . . .

Colder weather is rapidly approaching, if it has not already gripped your area. It means that mines will be much drier, with the explosive-dust hazard increasing apace. Give your mine or section a close inspection to be certain that you have no dangerous accumulations of coal dust and that your rockdusting is all that it should be.

INDUSTRY'S ALL-TIME FAVORITE FOR LONG RANGE *Economy*

JENKINS
Fig. 106-A
Renewable Composition Disc

BRONZE GLOBE VALVE

150 lbs. Steam
200 lbs. O.W.G.

Take a Jenkins Fig. 106-A apart. It's easy to see why it is industry's all-time favorite. Note the liberal dimensions of body and bonnet casting — the heavy, manganese bronze spindle, with more strong threads in contact with the bonnet, regardless of spindle position. See how the slip-on, stay-on disc holder fully protects the edge of the disc, prevents creeping, flaking, or cracking.

Every part, from perfect grip, heatproof handwheel to pipe ends, reflects the designing skill of Jenkins valve *specialists.* There's a good reason. Jenkins Bros. introduced the *first* renewable composition disc valve, — is today the only manufacturer of both valves *and* discs.

Fig. 106-A not only looks better — it proves out better in performance. In any comparison, its long life, low upkeep record has never been surpassed. That is the true measure of valve cost — and it is the reason why industry's shrewdest buyers will settle for nothing less than Fig. 106-A quality.

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros.

GET THIS FOLDER — Gives details of Fig. 106-A design, and "family" interchangeability. Ask your Jenkins Distributor for Form 189-A, or write Jenkins Bros., 100 Park Ave., New York 17.

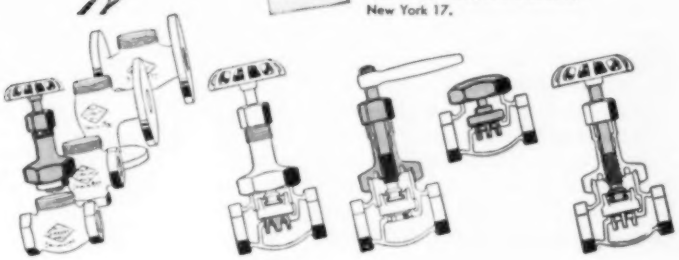


Fig. 106-A "Family" interchangeability meets 90% of your valve needs with a small inventory of parts. Start with the standard Fig. 106-A. Trimming is interchangeable in Globe or Angle body, screwed or flanged. With a few parts, quickly-assembled combinations provide a Lift Check, a Spring-loaded Check, and valves for Stop and Check, Quick-opening, or Throttling service.

How PROSPEROUS Is The USA?

Just how prosperous *are* the people of the United States?

The sole purpose of this message is to help clear up the confusion and controversy that surrounds this important question.

To find out how much prosperity, or material well-being, the people of the United States now enjoy, it is necessary to get answers to these questions:

1. As compared with other times, what is the total amount of goods and services that we have available for our enjoyment?

2. How great, on the average, is the share of each American in this prosperity?

3. How does our prosperity compare with that of other nations?

National Product at Peak

The government statisticians who do the bookkeeping for the nation produce a figure called the Gross National Product. It is supposed to be the total obtained when you multiply the amounts of everything we produce by the prices of everything produced. This year the GNP, as it is commonly tagged, will add up to something like $345 billion.

Since this will be the highest total that GNP has ever attained, some people will acclaim it as evidence that we now are enjoying the greatest prosperity on record.

The GNP, however, is not an accurate yardstick of prosperity. It may go up because of price inflation alone without any increase at all in the output of goods and services. Also the GNP includes very large amounts of goods and services, such as those for the military, which are in fact a result of misfortune rather than of a condition that might properly be called prosperity. Moreover, there is no deduction from the GNP to make allowance for the equipment that is worn out in producing it.

Little Recent Progress

When we make adjustments such as these—to find out how much of our production really is available for the use and enjoyment of the civilian population—the *adjusted* national product since the beginning of World War II comes out about as follows. The effects of price inflation have been removed from these figures.

YEAR	ADJUSTED NATIONAL PRODUCT	
	Billions 1951 Dollars	Index (1946 = 100)
1940	$176.2	76
1946	232.5	100
1947	240.7	104
1948	244.3	105
1949	239.7	103
1950	260.9	112
1951	267.9	115
1952	264.3	114

From this table the fact stands out that progress in raising our level of prosperity has been halting. What progress we have made came in a few dramatic increases before or after a military build-up. Aside from those, the progress has been fairly slow. This year, 1952, it has been particularly discouraging.

Again, when account is taken of the number of people who must share in the goods and services that are available, our progress is even less marked. This is shown by the following table which gives the share of the average American in the national product. This, as the table indicates, is arrived at simply by dividing the total of available goods and services by the population on hand to share in them.

YEAR	POPULATION Millions	ADJUSTED NATIONAL PRODUCT Billions 1951 Dollars	ADJUSTED NATIONAL PRODUCT Per Person
1940	132.0	$176.2	$1,335
1946	141.3	232.5	1,645
1947	144.0	240.7	1,672
1948	146.6	244.3	1,666
1949	149.2	239.7	1,607
1950	150.6	260.9	1,732
1951	154.4	267.9	1,735
1952	156.9	264.3	1,685

Here it is clear that we have made little or no headway since the end of World War II.

U.S. Compared to Other Nations

Although we are making slow progress in increasing our prosperity, as measured during recent years by the amount of goods per person, we still are by long odds the most prosperous people on earth. This can be seen from the following table. It offers a rough measure of how the adjusted output of goods and services per person in the United States compared in 1951 with that in a number of other countries:

COUNTRY	PER PERSON
United States	$1,735
Canada	1,231
United Kingdom	614
France	510

To figure more closely "How Prosperous is the U.S.A.?" we must answer a number of other questions. One of the most important will be the subject of a later editorial in this series. It is "Who Gets What?" How have various income classes and occupational groups shared the total available goods?

Another question that has a basic bearing on the quality and durability of our prosperity is "How fast are we using up irreplaceable natural resources, such as oil, iron ore, and copper, to sustain it?" Any attempt to deal with this very complicated question must also be deferred.

A Problem for the Future

In the meantime, however, key facts about our prosperity are that:

1. Most of the increase in the nation's total production in recent years has been to meet military requirements rather than to improve the American standard of living.

2. The increase in the supply of goods and services actually available for the average American has been slow and halting.

3. We Americans are still extremely well provided with the good material things of life, as compared with peoples in other lands.

These three facts bring to mind a whole series of policy questions. What can be done to speed up progress in improving our prosperity? What—to repeat the question discussed in the previous editorial in this series—can be done to make our prosperity less precarious?

Here, however, the purpose is not to prescribe. It is simply to indicate as accurately as it can be done in a brief article the actual state of the nation's prosperity.

In doing this much, it can properly be remarked that the record presents to the American economy both a problem and an opportunity of surpassing importance. It is that of building a prosperity that will be both more progressive and more secure than any we have known in recent years. In the light of what clearly remains to be done, we shall make a grave mistake if we use up any of our energy in congratulating ourselves on the relatively meager progress here recorded

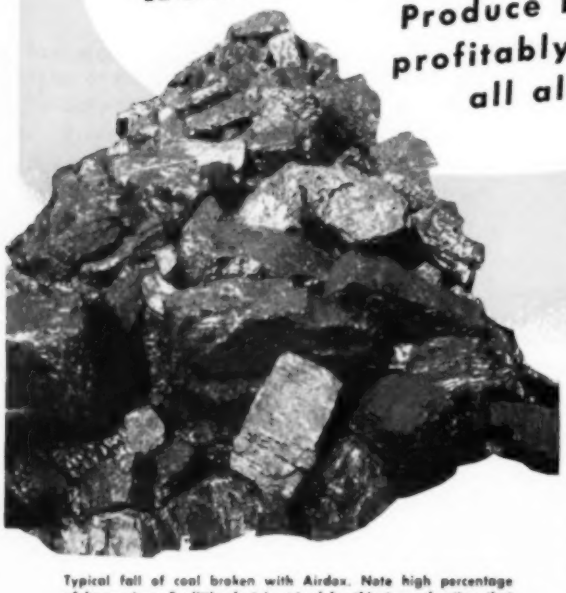
McGraw-Hill Publishing Company, Inc.

more ECONOMICAL PRODUCTION

AIRDOX
CARDOX

NON-EXPLOSIVE MINING METHODS

Produce better coal—more profitably—with savings all along the line



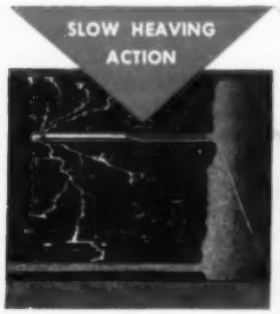
Typical fall of coal broken with Airdox. Note high percentage of large sizes. So little dust is raised by this type shooting that miners may begin loading coal almost immediately after the shot.

You uncover a whole string of advantages—all tied in to lower cost, safer mining—when you use AIRDOX or CARDOX to *break loose*, not *blast loose*, a fall of coal. Here's why:

Both use powerful, non-shattering forces—the one compressed air, the other expanding carbon dioxide—to *heave* the coal forward in a looser pile that's easier for mechanical loaders to handle. They both produce less fines—which means easier cleaning and less cleaning loss. Coal holds up better in handling, transit and storage, with minimum degradation.

Equally important, both AIRDOX and CARDOX, help keep mine roofs freer of shatter-cracks, which reduces expensive maintenance. Both eliminate fire or explosion resulting from shooting, enabling many mines to save time and money through *safe* on-shift shooting.

In an ever-increasing number of mines, AIRDOX and CARDOX are proving their worth as low-cost production tools. Let us show you how they can help *you* produce lower cost, yet higher quality, more marketable coal.



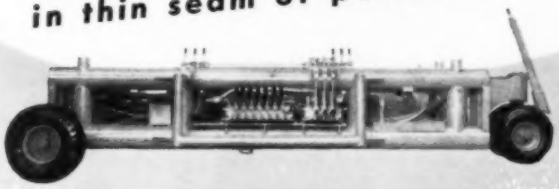
Which Method for You?

Both Airdox and Cardox offer impressive advantages and economies. Which is best for you can be determined after our engineers have joined yours in studying your mining operation. There's no obligation. Just ask that one of our men call on you soon.

plus "BONUS" TONNAGE

CARDOX-HARDSOCG *Underground* AUGER MINER

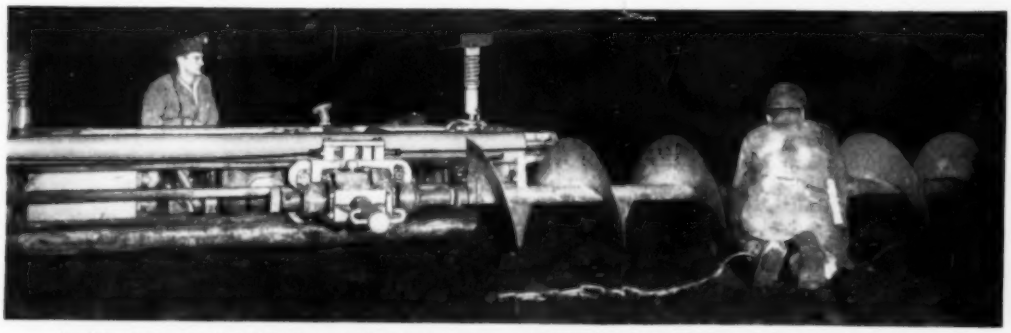
Turns "lost coal" into "profit coal" in thin seam or poor roof areas



Underground AugerMiner. Removable rubber tired tramming gear and low overall height make it easy to move and set up in restricted areas.

The Cardox-Hardsocg Underground Auger-Miner gives you profitable production of coal that is impractical to mine by any other means. The machine and its operators remain safely in the area of good roof condition while the auger drills high grade coal out of the thin seam or poor roof area—and at a cost that's usually far less than the original working.

The 25 HP Auger Miner handles augers up to 28" in diameter in 6' sections that are quickly and easily coupled to drill as far as 100' into a seam.



AugerMiner in operation. Vertical direction control keeps auger firmly in seam away from shale or other impurities. Hydraulic roof and floor jacks keep machine firmly in place. Set-up provides top efficiency when teamed with portable conveyor for rapid coal removal.

MINING DIVISION

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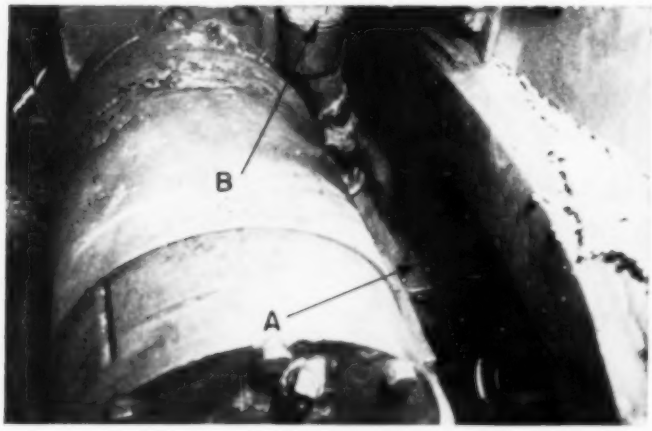
Informative Bulletin available on Abdon, Cardox and Underground AugerMiner. Write for them.

Operating Ideas

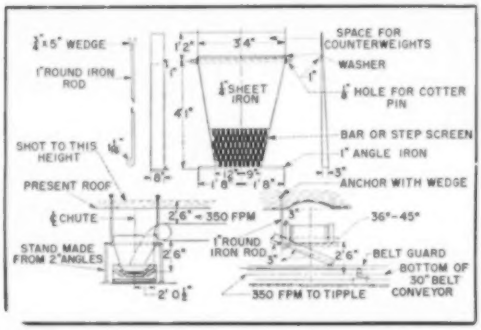
Loading Machine Revised To Eliminate Oil Spillage



ON THE OLDER MODELS of 14-BU loaders, filling the hydraulic oil reservoir was a difficult job. As shown in the illustration, the filler cap was originally down in Position "A" where it is hard to get at. Moreover, it was necessary to use a hose or special long-snout funnel. Often more oil was spilled than went into the hole.

The photograph, taken at No. 2 mine of the Bowman Elkhorn Coal Co., shows how Charles Calhoun, chief electrician, added a filler pipe to the machine. It is of welded construction and has some peculiar bends to avoid interference with the boom. At the top end, "*B*" indicates the filler cap at the flared mouth.

The coal from this mine is trucked to Esco No. 10 central preparation plant of the Utilities Elkhorn Coal Co., Esco, Pike County, Ky.



COUNTERBALANCED TRANSFER CHUTE saves wear and tear on belt conveyor at transfer points.

Transfer Chute Saves Belt Conveyor

"IT IS IMPOSSIBLE to put into dollars and cents the amount that these chutes have saved . . ." is the way that N. W. Long, resident engineer, Red Jacket Coal Corp., Red Jacket, W. Va., expresses the savings made with the underground belt transfer chute which he designed for installation in the Mitchell-Branch mine. Experience in the past 2½ yr has proven that belt damage is negligible, practically all abrasion being on the chute screen. While it has been necessary to replace the screens every 40 to 70 days damage to the belt has been insignificant.

This chute (originally described in *Coal Age*, May, 1951) lets the fines through first to form a cushion for the lumps, turns the coal so it discharges parallel to the direction of belt movement and lowers it to within a few inches of the belt, yet swings up automatically to allow passage of inby coal.

Installation of the unit is simplified by two 1-in-diameter rods anchored similarly to wedge-type roof bolts. Counter weights and off-end suspension make the unit swing up to the belt when there is no coal passing through.

How to Repair a Bent Cutterbar in the Mine

HAVE YOU BEEN FACED with the problem of having to straighten a bent cutterbar on a universal cutting machine without removing the bar and taking it to the shop? George T. Fisher, of Ronco, Pa., read in the August issue of *Coal Age* how to repair a sprung cutterbar in the shop and thought perhaps others could profit from his idea on how to straighten one without removing it from the machine.

Here is how Mr. Fisher does the job. The cutting machine is trammed to the face or a convenient solid rib and the cutterbar is put in the shear position. Next the bar is sumped into the coal to the desired depth, which is determined by the place where the bar is bent. Bracing is used to prevent breakage or other damage to the bar. The machine is then swung in the direction necessary to straighten the bar. One precaution to be kept in mind is to have the cutter bar warm before attempting to straighten it. Generally, cutting two or three places is sufficient to heat the bar to the necessary temperature.

This method makes possible a speedy and inexpensive repair which normally would require many man-hours of labor, Mr. Fisher reports.

GO FARTHER, FASTER MOVE MORE COAL

WITH BATTERY POWER

In many mines, battery-powered shuttle cars give more ton-miles per shuttle car-hour . . . travel faster . . . discharge faster . . . travel greater distances . . . produce more tons per man-shift . . . reduce cost per ton! All this in addition to safety unequalled with any other type of power!

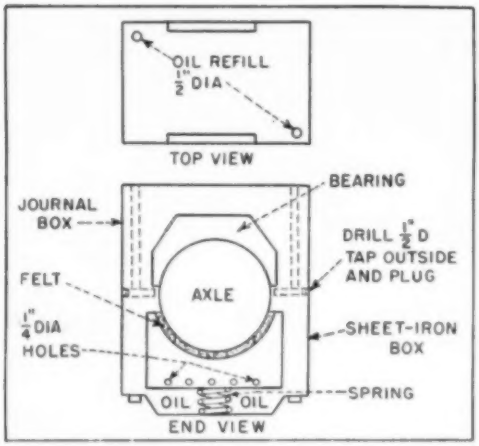
Battery car users—you may be able to increase battery service as much as 50% with the Gould Plus-Performance Plan. Write Gould Battery Information Headquarters for details.

The Gould "Thirty"
America's Finest
Mine Shuttle Car Battery

GOULD *Industrial Batteries*

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries



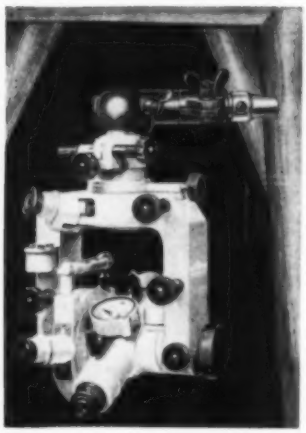
Automatic Oiler Increases Journal-Bearing Life

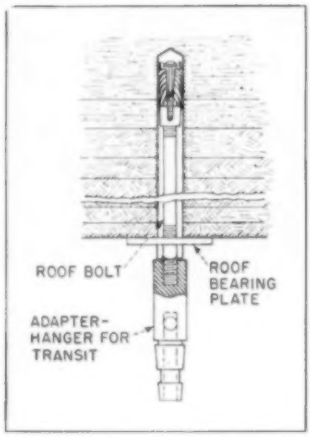
JOURNAL-BEARING LIFE on inside frame locomotives has been increased from 4 or 5 mo to about 7 yr by using an automatic oiler that is easy to make, R. W. Evans, Princeton, W. Va., reports.

Continuous oiling is provided from an oil reservoir through ¾-in felt, set on edge and cut to axle diameter, packed in a sheet-metal box installed in the journal box. Elimination of wool-waste packing in journal boxes has saved many man-hours of labor. Small holes near the bottom of the box permit oil to flow from the oil cellar to the felt. A mine-pump spring installed between the bottom of the sheet-metal box and the bottom of the oil cellar keeps the felt pressed firmly against the axle. Refilling of the reservoir is done through two ½-in-diameter vertical holes in the journal box.

Savings credited to the oiler are: fewer bearings used, less oil consumed and repacking practically eliminated. One locomotive equipped with the oiler has been operating since 1945 without having any bearings replaced.

Suspension Transit Speeds Surveying





A EUROPEAN METHOD for rapid surveying of pitching beds of coal is offered by the application of the suspension theodolite (transit) to mine surveying. This instrument, used in British and continental mines, fulfills the following requirements for rapid surveying: (1) easy fixing of permanent stations either in the roof, rib or their respective supports, (2) simplified and reliable interchangeability of the instrument and the targets and (3) self-centering to permit automatic and quick setting-up of fixed stations.

The theodolite and targets generally are suspended by steel pins driven into the rock or timber. However, two recent developments have become important factors in facilitating the wider application of suspension theodolites: (1) increased use of roof bolts for roof support and (2) availability of powder-powered hammers to install anchors.

This method of surveying offers:

1. Minimum interference with mine haulage and production.
2. Output per man on the survey party is as much as three times greater, and in adverse conditions productivity may be as much as five times greater.
3. Surveying can be carried out by a two-man party, using self-illuminating targets.
4. The transitman has more freedom of movement around the instrument.
5. Instrument design permits rapid centering and leveling.
6. The instrument can be used in most restricted places where a tripod instrument cannot.
7. Survey stations can be established quickly.
8. Surveying can be done by less experienced personnel.

In mines where roof bolting is practiced, a female threaded adapter-hanger can be quickly fixed to the protruding end of the roof bolt and the theodolite attached ready for surveying. Station numbers can be punched on the bearing plates. Where roof bolting is not practiced, a powder-powered bolt-driving gun may be employed to shoot threaded studs into steel, concrete, rock or wood. The gun fires various sizes of cartridges, depending upon the material to be penetrated. Bolts driven by the power gun are equipped with male threaded heads to which female threaded adapter-hangers are attached.

In setting up the suspension theodolite, the socket-head-type hanging device of the instrument is pushed on the truncated-cone of the adapter and when the instrument is roughly vertically the first wing nut is tightened. Bringing the instrument as nearly level as possible with one hand while tightening the second wing nut, the ball and socket is gradually clamped. Final leveling is done by the use of opposing screws and bubbles. The suspension theodolite illustrated is a unit made by Breithaupt & Son, Kassel, Germany, and now available in the U. S.

More on Shuttle-Car Controls

Commenting on the "Operating Idea" reporting how "Analysis of Haulage Accidents Points Way to Mine-Built Shuttle-Car Improvements" at the Sonman mine of the EG&FA Coal Div. *Coal Age*, August, pp 118-120, Wayne R. Gerdes, sales engineer, Goodman Mfg. Co., cites a question asked in the article, as follows: "'Why are shuttle-car controls so arranged that one second the right foot operates the brake and the next second the left foot is used?'

"Evidently, the author of this article is not acquainted with Goodman shuttle cars." Mr. Gerdes writes, "since all Goodman shuttle cars that have ever been shipped have had the control compartments so arranged that the operator used the same foot for braking in either direction of travel. Also, he used the same foot for acceleration, regardless of the direction traveled. This, of course, naturally assumes he faces the direction he is traveling on the corresponding seat for that direction."

HAULAGE WAYS Jr.

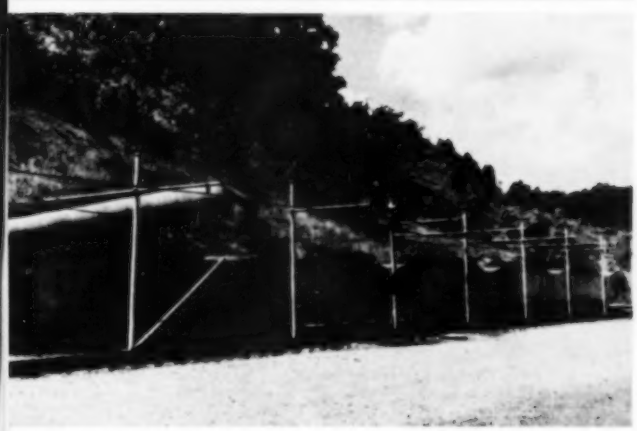
Rubber draft gear holds coupler heads level, in position and ready to join at impact with mating heads.

Rubber Draft Gear "SOAKS UP" Haulage Punishment

● O-B Couplers eliminate slack between massive 30-ton cars on this modern haulage system, protecting cars--and their loads--from severe jolts and jerks. Haulage punishment is absorbed in the couplers' rubber draft gear, by compression of rubber pushing and pulling pads.

Wherever O-B Form-8 Automatic Mine Car Couplers are used, rubber draft gear ranks high as an important feature. Here, for example, rubber draft gear allows a loaded trip of five 30-ton cars to be started and stopped evenly, without jarring either cars or their loads.

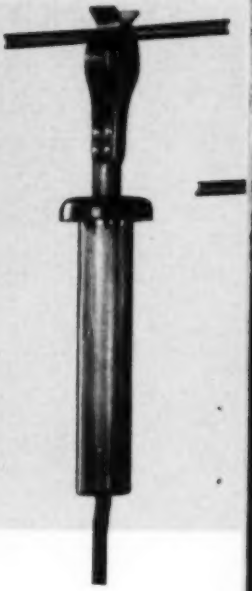
Excellent condition of the cars and couplers shown here gives proof of the O-B Couplers' ability to "soak up" haulage punishment. Get this same protection for yourself when the time comes to repair or replace your mine cars!



Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.



YOU CAN BE *Choosey* WHEN PICKING FUSED TAPS

O-B Offers 6 Contacts, 3 Terminals for use with Form-H Fused Taps

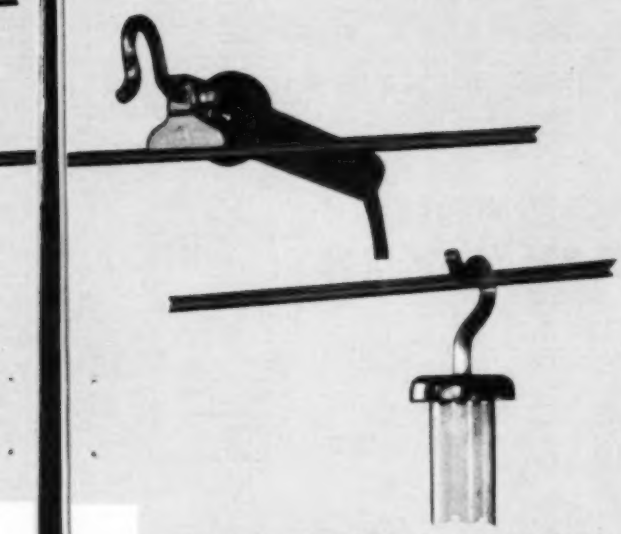
● Wise selection of O-B tap contacts and tap terminals gives you combinations of cable-holding ability and proper electrical contact for every power-tapping situation. You'll find that just a few combinations--kept ready in stock--handle the normal operating conditions in your mine. One popular group found on many stock-room shelves and underground includes two contacts – Spring Type and Hook Type – and H-2 Bottom Terminals.

But since operating conditions vary from one mine to the next--sometimes within one mine--it is unreasonable to expect one combination to fill the bill for every new situation. That's why it's nice to know that O-B offers six different contacts, and three different bottom terminals. They're available when you need to lick unusual power-tapping problems. See them all described in your O-B No. 27 Catalog, pages 76A thru 76F.

Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.



Four popular O-B Tap Contacts. From left to right: Plier Type, No. 22096; Spring Type, No. 21832; Clamp and Glider Type, No. 22085; Hook Type, No. 16181. Refer to your O-B Catalog No. 27 for information regarding these and other fused tap contacts.

Bottom terminals offer three methods of cable attachment. High holding strength, quick attachment without special tools, and good electrical contact are features of these bottom terminals.

H-1 Bottom Terminal, No. 22082, for No. 6 to No. 2/0 cable.

H-2 Bottom Terminal, No. 22093, for No. 1 cable; No. 22094 for No. 2 and No. 3 cable; No. 22152 for No. 4 cable.

H-3 Bottom Terminal, No. 22241, for No. 14 to No. 2 cable.

COPIES OF
Roof Bolting "Manual"
AVAILABLE

Month before last we sent a big 20-page roof-bolting "manual" to readers of our monthly magazine, O-B HAULAGE WAYS. May be you missed your copy. Or maybe you don't see O-B HAULAGE WAYS regularly. Either way, we'll be glad to send some copies for you and your bolting crews.

Some of the subjects covered in this booklet are:

- **Current Roof Bolting Techniques**
- **Accessories for Roof Bolt Installations**
- **Testing Installed Roof Bolts**
- **Use of Hole Gage**
- **Typical Equipment Used in Roof Bolting**

OHIO BRASS COMPANY
380 North Main Street
Mansfield, Ohio

Please send me _____ copies of your roof-bolting "manual," No. 5768-M.

Name _____ Title _____

Company _____

Address _____

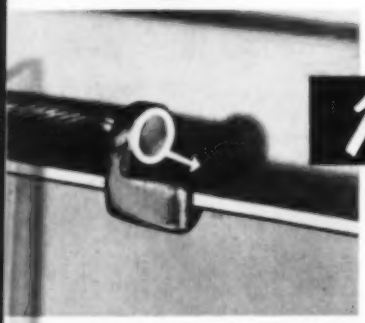
City _____ State _____

HAULAGE WAYS *Jr.*

LOOK FOR THESE POINTS WHEN BUYING RAIL BONDS!

Compare Ohio Brass AW-22's with all the rest!

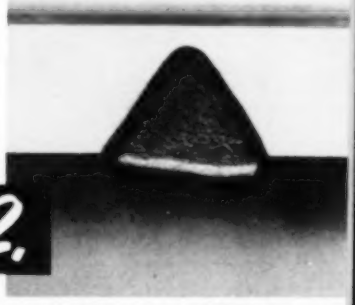
Ohio Brass AW-22 Rail Bonds beat the field on these four important points--points that determine whether or not any bond is suited for use in rough mine haulage service.



1.

Short Copper-to-Rail Path And Low Terminal Resistance

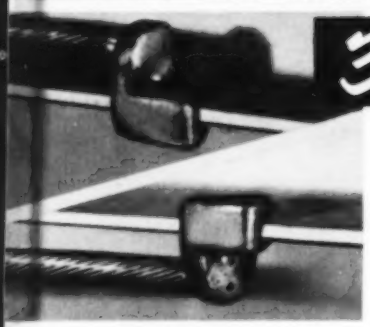
Strand arc-welded to lug of terminal at outer face, bringing copper through lug, as close as possible to rail.



2.

Welding Ease

Triangular shape and beveled edges bring weld area out into the open, easily reached with rod.



3.

Strand Over or Under Base

Quick, easy welding in either position. Under base installation gives protection from dragging equipment.

4.

Reclaimable

Terminal reclaimed without damage. Needs no repair before being used again.

Ask **your O-B representative to show you a sample of this bond. Then you can see the advantages!**

Ohio Brass

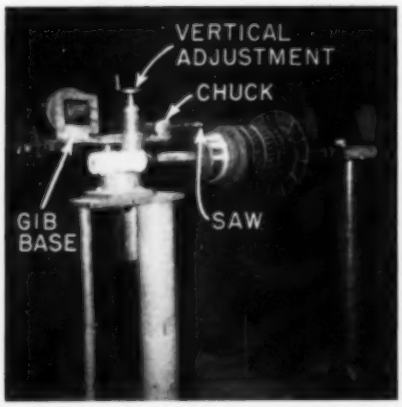
MANSFIELD OHIO, U. S. A.

IN CANADA CANADIAN OHIO BRASS CO. LTD. NIAGARA FALLS ONT.

4304-M

Mica-Undercutting Machine Speeds Operation

DESIGNED AND BUILT in the mine shop by Mose Pitzer, master mechanic, Slab Fork Coal Co., Slab Fork, W. Va., the unit illustrated reduces mica-undercutting time 50% and frees a lathe when armatures are to be tested. Built mainly in spare time from scrap material, the machine handles ¼- to 150-hp armatures on shafts up to 70 in long.



A discarded washing-machine motor belt drives the adjustable cutting wheel. Both are mounted on an adjustable platform, providing for undercutting different-size armatures. The mica saw is connected to the driven pulley by 5/16-in Allen screws, permitting use of various size cutters. Accurate horizontal alignment of the motor base is accomplished by gib-mounting. Vertical adjustment is by a hand wheel operating a screw and nut combination inside a 2-in pipe. A lock-screw prevents movement after a setting has been made.

Mr. Pitzer, shown operating his undercutter, states that he knows of no similar machine on the market.

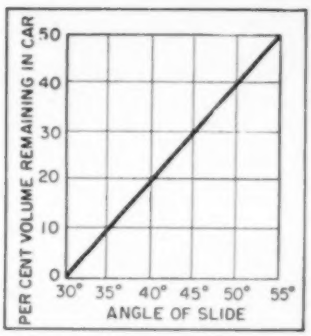


FIG. 1—WHAT GRAVITY can and can't do—per cent material remaining in car after gravity discharge.

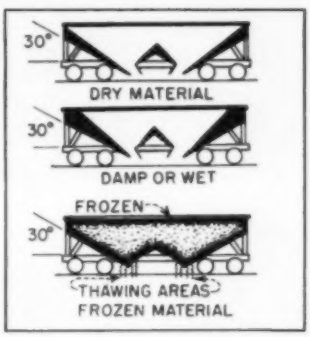


FIG. 2—CHANGING CONDITIONS change the unloading problem—how moisture and freezing affect it.

How to Shake the Unloading Problem

By T. S. ABBOTT
Allis-Chalmers Mfg. Co.,
Milwaukee, Wis.

PRACTICALLY all hopper cars used to transport coal are built with the steel-plate floor (slope sheet) on an angle of 30 deg from the horizontal. This means that under ideal conditions material with a slide angle of 30 deg or less will discharge completely by gravity. But if the slide angle is more than 30 deg, all the material will not flow out and part will require assistance to discharge.

With coal, the angle of slide varies with type, size, packing, moisture content and so on. Normally, it is less than 30 deg. Typical figures, taken from the Stephens-Adamson General Catalog No. 55, are shown in the table:

	Slide Angle, Deg.
Anthracite, broken, any size, loose	22
Anthracite, Chestnut	22
Bituminous, minus-¼ slack, dry	29

Unloading conditions, however, frequently are less than ideal, for the reasons given previously. When wet, for example, the slide angle for bituminous slack jumps from 29 to 40 deg. Freezing, of course, can prevent sliding completely and necessitates thawing before the coal can be discharged. Fig. 1 shows volume of material remaining in the car at various slide angles. Fig. 2 compares graphically the situation with dry, wet and frozen material.

For 40 deg, for example, the volume of material remaining in the car is 20%. If the car is loaded to 50 tons, meaning, with coal, normal loading to approximately the eaves after settlement, the material left after gravity discharge would be approximately 10 tons.

Manual unloading is expensive in time and manpower. In addition it involves a serious hazard when men are forced to work in the car. A mechanical method, such as a car shaker, requires only one man—at the controls and away from the car—thus promoting safety and saving substantially in man-hours. As an example, one coal consumer normally employed three men for unloading, with two additional in winter. With the car shaker, the permanent unloading force is one man, with a second to handle thawing in winter. Since men are not required to get into the cars, the injury rate is practically nil.

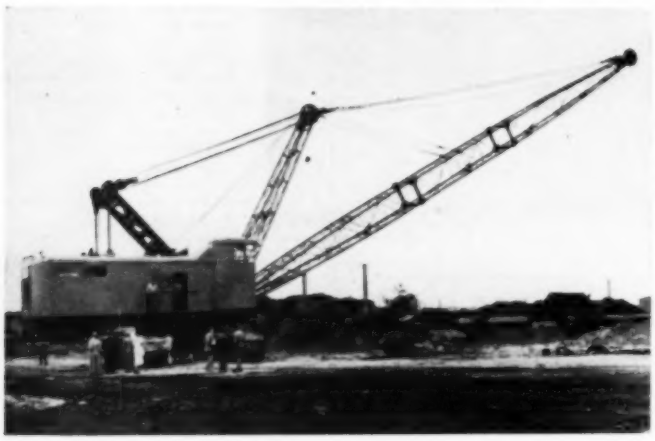
A car shaker will unload up to 15 cars per hour. Its principle is simple—the production of a relative movement between the slope sheet of the car and the material within. Too low a car-shaker speed will not produce the necessary movement and too high a speed will damage the car. By operating the shaker only long enough to cause the material to flow out of the car, additional savings can be made in operation and maintenance.

Shaker installation also can be varied to suit conditions. For example, it may be fixed in one position to take the cars one by one, or it may be mounted on a monorail for emptying a series of cars without moving them.

CREDIT MISPLACED: In the "Operating Idea" describing Guniting to prevent daily scaling of the roof at the bottom of a new portal and air shaft at the Crichton No. 4 mine of the Johnstown Coal & Coke Co. (*Coal Age*, September, p 114), the firm doing the work was incorrectly reported. The Cement Gun Co., Allentown, Pa., handled the Guniting project and should have been so listed.

Equipment News

Crawler-Mounted 8-Yd Dragline Offers Smooth Operation and High Output (1)



New P&H Model 1855, said by the maker to be the largest dragline ever mounted on a single pair of crawler frames, features four separate Magnetorque units which control every motion of the 8-yd unit to permit elimination of friction clutches entirely. Using magnetic pull instead of mechanical friction, the exclusive Magnetorques transmit power without mechanical linkage or wear and their ease and smoothness of operation means an absence of shock loads and an increase of daily output, it is said. Model 1855 can handle an 8-yd bucket with a 120-ft boom, or a 7-yd bucket with a 150-ft boom, and is powered by an 8-cylinder Cooper-Bessemer FV8 590-hp diesel engine. Hoist-line speed is reported at 246 fpm and digging-line speed at 199 fpm. The first model has been purchased for coal stripping by the Wingert Contracting Co., Butler, Pa. Write in No. 1 on the postage-free card facing p 124 for full details from Harnischfeger Corp., Milwaukee, Wis.

Flexible and Semi-Rigid Plastic Pipes (2)

Two new plastic pipes, Triangle Flexible and Semi-Rigid, available in various sizes up to 6 in, feature extreme light weight, a smooth interior for greater flow, and resistance to rot, rust and electrolytic action, the maker says. Triangle Flexible pipe is made of polyethylene in three types: non-toxic to handle liquids for human or animal consumption; industrial for mining and other use; and suction for higher pressures in the larger sizes. The Semi-Rigid, made of butyrate, is said to be flexible enough to follow ditching contours but have an impact strength eliminating special care in backfilling. Detailed booklet available from Plastic Products Div., Triangle Conduit & Cable Co., New Brunswick, N. J.

Mine Phones Handle Many Stations (3)

Femco Audiophones, an improved and simplified method of electronically amplified voice communication wired to order, are offered as common-talking systems consisting of press-to-talk release-to-listen microphones and speakers at as many stations as desired. Unless otherwise engineered to individual requirements for private 2-way conversations, all stations simultaneously hear all directions, orders, warnings or questions. Power is drawn from 110-v 60-cycle lines with simple plug-in attachments, and extensive networks can be installed and coordinated by use of multiple amplifiers and boosters. Bulletin 26 with full data from Farmers Engineering & Mfg. Co., Irwin, Pa.

HOW KENNAMETAL ROOF BITS HELPED BOOST PRODUCTION 25%

HITCH TIMBERING with KENNAMETAL BITS INCREASES AIR COURSE 20%

Kennametal SD 6½-inch Drill Bits are used in the Nelms Mine to drill for hitch timbering throughout the haulage ways. Four 3½ foot holes are drilled per setup and to date about 4,000 hitch installations have been made. Air course has been opened up about 20%, and safety conditions improved.

SPECIAL SLABBING METHOD GIVES ⅓ MORE RECOVERY

An unusual method of recovery is practiced by the Nelms Mine in bolted areas. Eighteen foot rooms with bolts at three foot centers are driven all the way up, nine feet are slabbed out, and timbering is done as the coal is loaded. Recovery is about ⅓ more than formerly obtained.

The Nelms Mine of the Youghiogheny and Ohio Coal Co. has tried every available make of roof bit in their extensive roof bolting program. Their records show that the Kennametal HFD Rotary Roof Bits now in use consistently deliver the best performance and service.

These tough, Kennametal-tipped bits drill 42" holes in blue slate, shale, and sandrock at rates as high as 20 holes per hour per bit, with the result that roof necks are bolted in ⅙ the time previously needed. By so improving the efficiency of roof bolting, Kennametal Roof Bits are an important factor in the 25% tonnage increase that bolting has made possible in this mine.

Kennametal offers a complete line of bits for cutting and drilling—with tips whose shock and wear-resistant characteristics cannot be matched by any other tungsten-carbide in the coal industry. Kennametal representatives—men with years of actual mining experience—will recommend the right bit for the job, and go into the mine to demonstrate the operation. Call *your* Kennametal representative today!

Kennametal Inc., Mining Tool Div., Bedford, Pa.

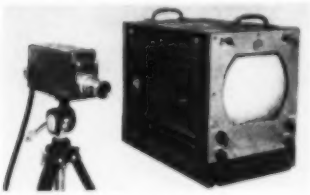
KENNAMETAL®

Quality Carbide Of The Coal Industry

World's Largest Manufacturer of Tungsten-Carbide Mining Tools

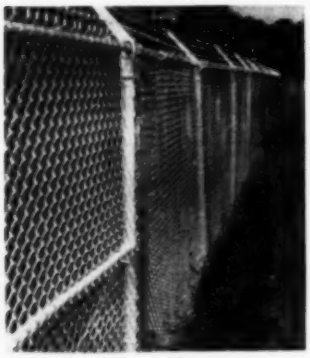
ALUMINUM AND COPPER WELDING WITHOUT HEAT (4)

New device for welding non-ferrous metals such as aluminum and copper without heat, flame or electrical current, and without acids, fluxes or chemicals, is of considerable significance in electrically wiring buildings and various equipment, the maker says. For butt-welding of aluminum wires the method is simply inserting the two wire ends into a small device (illustrated), and squeezing the plier-like handles, and is accomplished in a matter of seconds with no skill required. In the Koldweld process, there is an actual inter-molecular flow which accomplishes a small compact bond said to have a greater tensile strength than the wire itself. After removal of the flash metal, the bond is the same gage as the wire. The device shown, together with a bonding tool for sheet metal, is manufactured by the Utica Drop Forge & Tool Corp., Utica 4, N. Y., under arrangement with Koldweld Corp., New York 16, sole licensee of the process in the U. S. Bulletins available from the companies.



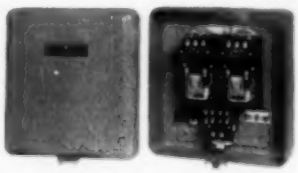
CLOSED-CIRCUIT TV (5)

Maximum simplicity, compactness and ease of operation, good picture quality and low-cost operation reportedly are featured in the new Model 1TV-5 closed-circuit television camera chain announced by the RCA Victor Div., Radio Corp of America, Camden, N. J. The system consists of two units, a small portable 7-lb camera and a combination monitor-power supply-control unit housed in a portable case smaller than a home table-model TV set. It is particularly designed to maintain continuous visual checks on numerous industry operations from a remote location.



NON-SPATTER COATING (6)

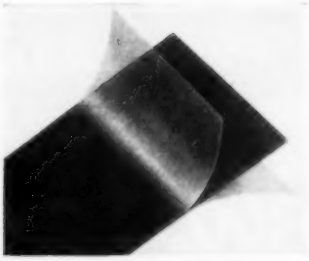
Roylac aluminum coating reportedly can be sprayed without spattering objects or surfaces 4 ft or more in the background since it dries upon 4 ft of travel from the spray-gun nozzle to a cottony non-adhering powder, as shown with the freshly sprayed fence above. In addition, Roylac provides a superior and tightly bonded corrosion-resistant film with a bright aluminum finish and is particularly effective exposed to acid-type fumes and salt or moist air, the maker says. Details and test sample from Royston Laboratories, Inc., Blawnox, Pa.



AUTOMATIC THROWOVER (7)

New G-E automatic throwover panel, a control device that transfers electric circuits to an emergency power source when the normal source fails, consists of mechanically interlocked normal-source and emergency-source contactors, and a pilot contactor. Besides transferring circuits to emergency power and back again upon resumption of regular service, the contactors also control standby power equipment, turning it on and off at the appropriate times, and can be equipped with a time relay if necessary. Full details from General Electric Co., Schenectady 5, N. Y.

84 BULLETINS on underground conveyors are in the list beginning on p 124. You can get any of them without obligation, via the postage-free card.



ELECTRIC INSULATION (8)

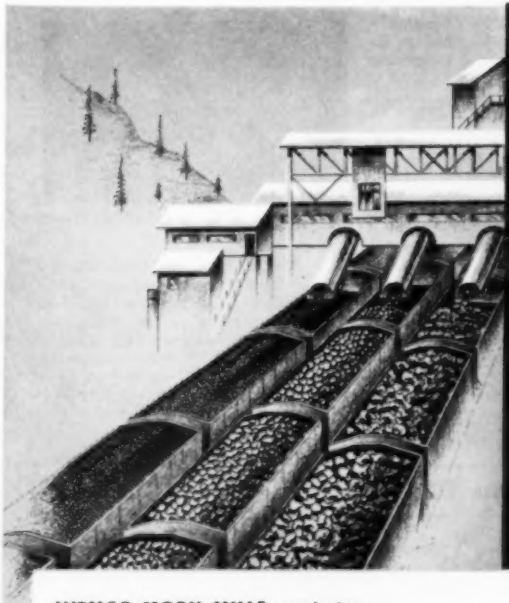
Aboglas Class B composite insulation, consisting of a layer of varnish-saturated asbestos paper sandwiched and securely bonded between two layers of varnished openweave Fiberglas, was developed for use in heavy-duty equipment subject to abuse and overloads in normal service. Aboglas is said to be tough, flexible and considerably less expensive than mica combinations and other Class B insulations and also cleaner and easier to handle because it does not flake and conforms to irregular surfaces without application of heat. Bulletin from Natvar Corp., Woodbridge, N. J.

PIPE-WRAPPING TAPES (9)

The anti-corrosion qualities of polyvinyl chloride and the ease of application of a pressure-sensitive tape have been combined in two new corrosion-resistant tapes manufactured exclusively for pipe wrapping and called "Scotchrap" pipe insulation Nos. 50 and 51 (formerly "Scotch" brand electrical tapes Nos. 22 and 21). They eliminate the need for tar pots and cumbersome equipment yet provide an economical pinhole-free cold coating that can be applied easily and safely to above-ground or buried pipes in a single step by regular crews, the maker says. Available and recommended widths are listed in bulletin offered by Minnesota Mining & Mfg. Co., St. Paul 6, Minn.

RIP-PROOF BELTING (10)

A new type of conveyor belt said by the maker to be virtually rip-proof is designed particularly for use where conveyor belts may be subject to severe ripping or tearing action by foreign objects. The special carcass has multiple strands of high-tensile steel wires imbedded at 3-ft intervals so that even if the belt is punctured, tearing is limited by the unusual construction to a maximum of about 3 ft lengthwise, it is reported. Full data from New York Belting & Packing Co., Passaic, N. Y.



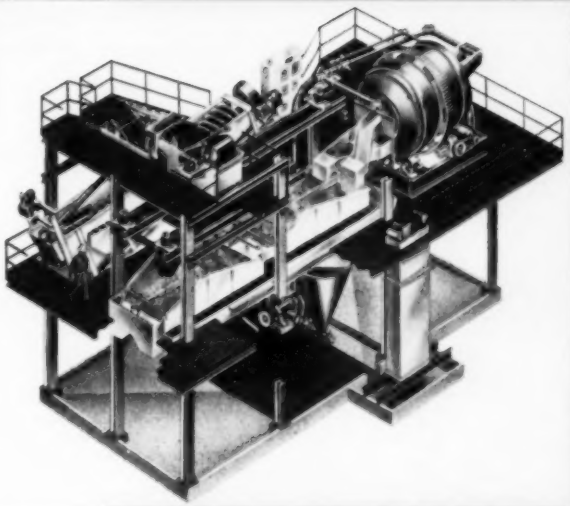
CLEAN COAL THE PROFITABLE WAY!

WITH WEMCO MOBIL MILLS

Today's coal market demands modern cleaning equipment designed to produce a premium-priced product, even from substandard workings.

WEMCO MOBIL MILLS, employing Heavy Media Separation, make available the most modern, most economical method of coal cleaning for the vast majority of operations. They assure high yield of **salable** coal at predetermined grade to meet varying market demands.

Mobil Mill cleaning is **precision cleaning**. It provides close control of washing operations and the flexibility needed for efficient cleaning over a wide range of sizes and grades. For coals containing middlings, the WEMCO MOBIL MILL with Double Drum Separator is the **only** HMS plant capable of producing **three** products by absolute gravity control. Accurate segregation of bone and other middlings from true float coal and true refuse permits recrushing and washing of this middling to produce a salable third product.



To fit your particular requirements, Mobil Mills are offered in a number of sizes with a choice of three basic types:

1. ***Drum Type Mobil Mill** for accurately controlled washing of a full range of sizes from 8" to ¼" with capacities up to 420 TPH.*
2. ***Double Drum Type Mobil Mill** for efficient cleaning of coal having complicated middling and washing characteristics. Capacities dependent on individual problem.*
3. ***Cone Type Mobil Mill** for efficient, large volume production of fine coal in sizes 4" to 3/32", with capacities up to 420 TPH.*

Write today for Bulletin M-3-M-4 and for a WEMCO recommendation on your coal cleaning operations — furnished without cost or obligation.

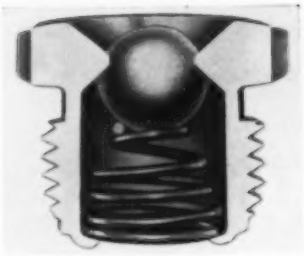
WEMCO

WESTERN MACHINERY COMPANY

760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

OTHER **WEMCO** PRODUCTS

Mobil-Mills · Coal Spirals · HMS Thickeners · HMS Pumps · Sand Pumps Cone Separators · Drum Separators · Fagergren Laboratory Units · Agitators Fagergren & Steffensen Flotation Machines · Hydroseparators · S-H Classifiers HMS Laboratory Units · Dewatering Spirals · Thickeners · Conditioners · Densifiers



FLUSH GREASE FITTINGS (11)

The problem of protruding heads of ordinary grease fittings being knocked off by a heavy blow or collision reportedly is remedied by a new line of Universal flush-type grease fittings that present negligible obstruction or opportunity for collision that might knock the fitting head off and impair the machine's function. A full line of fittings is described in the 1952 catalog from Universal Lubricating Systems, Inc., Oakmont, Pa.

GASOLINE LIFT TRUCKS (12)

Two new fork-lift trucks announced by the Hyster Co., Portland 8, Ore., have capacities of 8,000 and 6,000 lb and both are gasoline-engine powered and mounted on pneumatic tires. Designed as an ideal "outside" truck, the ZA-80 is said to be the first heavy-duty 8,000-lb industrial truck of its kind that can be operated efficiently indoors as well as out and features operator comfort, ease of daily servicing, safety, shorter over-all length, longer wheelbase and better weight distribution. The XA-60 model is a 6,000-lb-capacity version of the ZA-80 with the same heavy-duty features but with shorter wheelbase, width and over-all length.

Equipment Shorts You'll Want to Check

(13) BELT FASTENERS used for joining conveyor and elevator belts now are offered with assembled bottom plates in boxes of 100 sets which include the top plates and nuts as well, at the same price as for loose parts. Flexco fasteners are available of steel, stainless, monel, Everdur and Promal. Bulletin F-106 with details from Flexible Steel Lacing Co., Chicago 44.

(14) AUTOMOTIVE PARTS may be quickly and easily cleaned in a special 4-gal pail of Gumout that includes a sturdy lightweight metal dipping basket, called "Gumout 'n Basket." Eliminating the need for further manual cleaning or scraping and rinsing of parts after cleaning, Gumout is non-toxic, non-acid, non-caustic and completely harmless to the hands, the maker says. More details from Pennsylvania Refining Co., Cleveland 4.

(15) HANDY DRAFTING BOARD for use in field, office or shop is constructed so that the rule automatically parallels itself at any position from top to bottom and also features a plastic indicator that accurately measures the parallel movement. Made of lightweight pressed-wood board, the Par-L-L-Er comes in three models up to 21x25 in. Bradford Baily Co., Box 440, Elizabeth, N. J.

(16) NEW WIRE CUP BRUSH with replaceable filler for removal of rust, scale, paint and welding slag, recently added to the Hewitt-Robins Rubberlokt line, consists of inner and outer metal adapters with a replaceable cup-shaped filler in which the wire bristles are anchored in place with rubber. The new brush, expected to be more economical because the metal adapters need be purchased only once, is available in wire gages from 0.014 to 0.028 in. Hewitt-Robins Inc., Buffalo 5, N. Y.

(17) ELECTRONIC LEVEL INDICATOR, Telstor, designed for continuous-level measurement without mechanical or pneumatic equipment, is usable with tanks, bins, hoppers, vessels or practically any type container and reportedly will measure almost any type of liquid, viscous fluid or granular solids, including coal. The Telstor consists of an electronic unit placed near the tank or bin, an insulated electrode mounted inside and an indicator unit that may be mounted at a central or remote location up to 1 mi away. Lack of moving parts simplifies installation, operation and maintenance. Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia.

(18) PORTABLE RIVETING UNIT, the new Manco Model R-20-185, is operated by a patented manual-control hydraulic valve. Depressing hand lever on riveting head produces riveting action and when full pressure (adjustable to 30 tons) is reached, valve automatically provides ram retraction. The unit has a capacity

of 4½x½-in rivets. Details from Manco Mfg. Co., Bradley, Ill.

(19) ANCHORING ASSEMBLIES for pipe, conduit and guy wires are said by the Super-Grip Anchor Bolt Co., Inc., Philadelphia 40, to provide 50% greater anchorage in masonry. The pipe-bolt assembly is used for mounting conduit, gas, water pipe, etc., up to 1 in, while the eye-bolt assembly in bolt lengths to 6 in and hole diameter of ½ in is used for anchoring guy wires.

(20) EMPLOYEE TRAINING in various subjects through home-study courses of the International Correspondence Schools, Scranton 9, Pa., is currently available to industrial firms under four types of plans. Programs include special courses set up for individual companies, an apprentice-training plan, supervised group plans and cooperative arrangements.

(21) RING-TYPE RHEOSTATS—New 25- and 50-w Vitrohm ring-type rheostats feature a new contact-arm and drive-shaft assembly said to furnish smooth close control with no backlash and are designed for rheostat or potentiometer use in electronic and industrial control equipment where smooth gradual resistance change is essential. Watt ratings are based on 300 C rise in 40 C ambient, with resistance values for the 50-w size ranging from 1 to 7,500 ohms. Available from stock from Ward Leonard Electric Co., Mount Vernon, N. Y.

(22) FLOOR PATCH for repairing holes, ruts and other imperfections in concrete floors of all kinds, known as Superset Tampatch, is quick and easy to apply, the maker says. The patched area may be placed in service almost instantly, becomes smooth with moving traffic and will withstand extremely heavy loads, it is said. Details from United Laboratories, Inc., Cleveland 12.

(23) SNOW MELTER—Addition of a new phosphate-type Speconite rust inhibitor to Ice Rem ice- and snow-melting chemical pellets is said to safeguard against excessive rust in the deicing of metal pipes, drains, downspouts, railway switches, metal loading ramps and curbs, and when used on drives and streets, also retards rusting on automobiles, trucks and machinery. Said to have 30 times the thawing capacity of salt, Ice Rem is available in 10-, 25- and 100-lb containers from Speco, Inc., Cleveland 9.

THE POSTAGE FREE CARD facing p 124 will bring you more information. Just write the number of any of the 139 items in this section that interest you.

cleaned by the process that means top quality coal

WESTMORELAND COAL COMPANY'S CRITERION COAL

WESTMORELAND COAL COMPANY'S HAMPTON COAL

Important among the reasons for the maintenance of high quality coal mined at the Hutchinson, Magee and Hampton mines of Westmoreland Coal Company is the large part played by the Chance Process. The experience of Westmoreland Coal Company is typical of the experience of many leading coal operators.

Outstanding features of the Chance heavy density, sand-flotation process include:

High degree of flexibility—ability to handle coal at operating gravities from 1.35 to 1.65, with size range as small as ⅛" to one washing unit.

High separating efficiency—great recovery of salable coal, close to 100%, producing a low ash product and a high ash reject.

Dependable performance—steady, uniform, trouble-proof operation. Specific gravity of mixture remains constant; efficiency of separation is unaffected by fluctuating loads or changing qualities of coal.

Easy operation—change-over from one washing gravity to another can be made in five minutes, simply by opening or closing valves . . . all under one-man control.

Whatever your preparation requirements, there's a Chance Cone to meet them. Our engineers will be glad to cooperate with you in solving any of your coal-cleaning problems.

THE HEART OF YOUR PREPARATION PLANT

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WITH A BACKGROUND OF OVER SIXTY YEARS' EXPERIENCE

Literature Digest...Underground-Conveyors

We asked manufacturers of conveyors, belting, parts and accessories for underground coal-mine service to list all catalogs, booklets and bulletins they had available for *Coal Age's* readers—and then prepared this round-up as a checklist for your use. To obtain any of these bulletins without charge or obligation, *write in the item numbers on the postage-free card opposite*, fill in and mail card. We'll pass your request to the manufacturers.

GENERAL CATALOGS

(Conveyors, Parts and Equipment)

(23) General Conveyors—Catalog 76 (120 p), Barber-Greene Co.

(26) Conveyors and Components—Condensed Catalog 676MC (8 p), Barber-Greene Co.

(27) Conveyor Equipment and Engineering Data—Engineering Data Book 1D-481-A (64 p), Continental Gin Co.

(28) Face, Room and Entry Conveyors—Catalog 820 (56 p), Jeffrey Mfg. Co.

(29) Belt and Elevating Conveyors—Bulletin 49A (88 p), Kennedy Van Saun Mfg. & Engineering Corp.

(30) Belt Conveyors and Conveyor Equipment—Bulletin 612 (52 p), Pioneer Engineering Works, Inc.

BELT CONVEYORS

(31) Heavy Duty Portable Conveyors—Bulletin 374 (8 p), Barber-Greene Co.

(32) Medium Duty Portable Belt Conveyors—Bulletin 363 (8 p), Barber-Greene Co.

(33) Normal Duty Portable Belt Conveyors—Bulletin 362 (8 p), Barber-Greene Co.

(34) Belt Conveyors, Conveyor Rolls and Bucket Elevators—Bulletin D-48-E (8 p), Diamond Iron Works, Inc.

(35) Types 97-C & 99-3 Belt Conveyors—Bulletin CC-493 (18 p), Goodman Mfg. Co.

(36) Type 98 Belt Conveyor—Bulletin CC-522 (4 p), Goodman Mfg. Co.

(36A) Complete Mine Conveyors—Bulletin 127A (16 p), Robins Conveyor Div., Hewitt-Robins, Inc.

(36B) Belt-Conveyor Mining System—Bulletin 153 (8 p), Robins Conveyor Div., Hewitt-Robins, Inc.

(36C) Sectional Belt Conveyors—Bulletin 132A (4 p), Robins Conveyor Div., Hewitt-Robins, Inc.

(37) Cedarapids Belt Conveyors—Con-I (16 p), Iowa Mfg. Co.

(38) Maintenance and Handbook for Belt Conveyors—Bulletin BC-2A (24 p), Iowa Mfg. Co.

(39) Models MB, MTB & C Single- and Tandam-Pulley-Drive Conveyors—Bulletin LD-100 (28 p), Joy Mfg. Co.

(40) Belt Conveyors—Bulletin 1400 (32 p), Lippmann Engineering Works.

(41) Belt Conveyors and Conveyor Equipment—Bulletin 612 (52 p), Pioneer Engineering Works.

(42) Portable Belt Conveyors—Bulletin 690 (4 p), Pioneer Engineering Works.

(43) Sectional Underground Belt Conveyor—Bulletin 202 (4 p), Transall, Inc.

(44) Type C Channel-Mounted Sectional Belt Conveyor—Bulletin 204 (4 p), Transall, Inc.

(45) Belt-Conveyor Equipment—Catalog 60-B (155 p), Webster Mfg. Co.

CONVEYOR BELTING

(46) Conveyor Belting—Bulletin listing widths and types (8 p), Barber-Greene Co.

(47) Installation, Care and Maintenance of Rubber Conveyor Belting—Booklet (8 p), Carlyle Rubber Co., Inc.

(48) Cordura-Rayon-Reinforced Belts—Booklet, "Sinews for Industry," E. I. du Pont de Nemours, Inc.

(49) Goodrich Turnover Conveyor Belt System—Folder 2-7902-GI, B. F. Goodrich Co.

(50) Caricoal Beltings Used Chiefly in Underground Mines—Catalog 2-7959-GI, B. F. Goodrich Co.

(51) Conveyor-Belt Installation and Maintenance Book—Handbook 2-7960-GI, B. F. Goodrich Co.

(52) Conquest of Mildew—Bulletin A-5196-K (28 p), Goodyear Tire & Rubber Co.

(53) "Coal-Flo" Conveyor Belting—Bulletin A-5101-K (12 p), Goodyear Tire & Rubber Co.

(54) Steel-Cable Conveyor Belts—Bulletin A-5151-K (16 p), Goodyear Tire & Rubber Co.

(55) Rayon Conveyor Belts—Bulletin A-5155-K (4 p), Goodyear Tire & Rubber Co.

(56) King-Koal Underground Conveyor Belting—Bulletin, Hamilton Rubber Mfg. Co.

(57) Conveyor Belts—Manual (32 p), New York Belting & Packing Co.

(58) Conveyor Belts—Brochure, New York Rubber Corp.

(59) Belt-Installation Data—Catalog 51 (64 p), Pioneer Rubber Mills.

(60) How to Lengthen the Life of Industrial Rubber—Catalog, Pioneer Rubber Mills.

(61) Quaker Conveyor Belts and Construction (With Maintenance Tips)—Bulletin 63A (4 p), Quaker Rubber Corp.

(62) Stress Equivalents in Conveyor and Elevator Belting—Bulletin 62052 (4 p), Quaker Rubber Corp.

(63) Homocord Conveyor Belting—Folder 6906 (4 p), Raybestos-Manhattan, Inc.

(64) Ray-Man "F" Conveyor Belting—Folder 6915 (4 p), Raybestos-Manhattan, Inc.

(65) Catalog with Engineering Section—General Catalog, Raybestos-Manhattan, Inc.

(66) Splicing and Fastening of Conveyor Belts—Engineering Data Book, Raybestos-Manhattan, Inc.

(67) Belt Conveyors—Catalog 1500-A (59 p), Sprout, Waldron & Co.

(68) Conveyor and Elevator Belting—Catalog 3679 (16 p), Thermoid Co.

(69) Underground Conveyor Belts—Bulletin (4 p), U. S. Rubber Co.

(70) A Practical Way to Repair Conveyor Belts—Bulletin (4 p), U. S. Rubber Co.

(71) Conveyor Belting—Engineering and Installation Data (36 p), U. S. Rubber Co.

CHAIN CONVEYORS

(72) Model FA Room Conveyor—Bulletin LD-200 (8 p), Joy Mfg. Co.

(73) Chain Conveyors—Bulletin D-16 (4 p), Long Super Mine Car Co.

(74) Oro-Feeders—Bulletin 630 (20 p), Pioneer Engineering Works.

(75) Apron Feeders—Bulletin 563 (8 p), Pioneer Engineering Works.

(76) Underground Chain Conveyors—Bulletin A-408 (16 p), Vulcan Iron Works.

(77) Shaking Chute Conveyors—Bulletin A-242 (28 p), Vulcan Iron Works.

(78) Chain Conveyors—Bulletin 70 (131 p), Webster Mfg. Co.

ELEVATING CONVEYORS

(79) Portable Belt Hopper-Car Unloader—Bulletin 358 (4 p), Barber-Greene Co.

(80) Bucket Elevators—Catalog 1900-A (56 p), Sprout, Waldron & Co., Inc.

CONVEYORS FOR CONTINUOUS-MINER SERVICE

(81) Types PT-12 and PT-15 Piggyback Conveyors—Bulletin D-28, Long Super Mine Car Co.

SELF-LOADING CONVEYORS

(82) Automatic Duckbill—Bulletin CC-508 (8 p), Goodman Mfg. Co.

(83) Duckling—Bulletin CC-515 (2 p), Goodman Mfg. Co.

SHAKER CONVEYORS

(84) Accessories for Shaker Conveyors—

USE THIS CARD

. . . to get more information on any of the 23 new products described in this section . . . to get any of the 84 catalogs or bulletins on underground conveyors listed . . . or any of the 32 new bulletins below . . . Just write in item numbers, sign card and mail.

YES—I would like more information . . .

Please send me catalogs or further information about the items from the Equipment News Section whose numbers are listed. (November, 1952)

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In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

.....

Name (Print) ..... **Position**.....

Company .....

Address .....

NOT GOOD if mailed after January 1, 1953

Bulletin CC-509 (4 p), Goodman Mfg. Co.

(85) Duckbill-Shaker Conveyor — Bulletin CC-505 (8 p), Goodman Mfg. Co.

(86) Type E Shaker-Conveyor Drive—Bulletin CC-507 (4 p), Goodman Mfg. Co.

(87) Type C Shaker-Conveyor Drive—Bulletin CC-506 (2 p), Goodman Mfg. Co.

(88) Type L-20 Shaker-Conveyor Drive—Bulletin CC-494 (4 p), Goodman Mfg. Co.

(89) Model F1-12 Chain-Type Belt Feeder; Model UN-17 Shaker-Type Belt Feeder—Bulletin LD-101 (4 p), Joy Mfg. Co.

(90) Models U-12½, UL-12½, U-17, U1-17 Shaker Conveyors—Bulletin 120 (32 p), Joy Mfg. Co.

CONVEYOR PARTS, ACCESSORIES, ETC.

(91) Belt-Conveyor Idlers and Machinery—Bulletin 51-81 (42 p), Chain Belt Co.

(92) Power Transmission Machinery—General Catalog D49 (256 p), Dodge Mfg. Corp.

(93) Steel Conveyor Pulleys—Bulletin A-603 (8 p), Dodge Mfg. Corp.

(94) Speed Reducers—Bulletin A-614-A (20 p), Dodge Mfg. Corp.

(95) Alligator Conveyor-Belt Lacing—Bulletin A-70 (2 p), Flexible Steel Lacing Co.

(96) Precision Steel Roller Chain and Sprocket Wheels—Book 2457 (148 p), Link-Belt Co.

(97) Herringbone-Gear Drives — Book 2419 (56 p), Link-Belt Co.

(98) Gearmotors, Motorgears, Helical-Gear Drives—Book 2394 A (80 p), Link-Belt Co.

(99) "P. I. V." Variable-Speed Drives—Book 2274 (88 p), Link-Belt Co.

(100) Fluid Drives—Book 24875 (28 p), Link-Belt Co.

(101) Whispering Joint Chain-Conveyor Pans—Bulletin 1052 (4 p), Long Super Mine Car Co.

(102) Superflite Conveyor Chain—Bulletin 4001 (8 p), Long Super Mine Car Co.

(103) Belt-Saver Pulleys—Bulletin 35-A (4 p), Sprout, Waldron & Co., Inc.

(104) Belt-Conveyor Carriers — Bulletin 2-C (18 p), Stephens-Adamson Mfg. Co.

(105) Heavy Duty Prelubricated Belt-Conveyor Idlers—Catalog 203 (12 p), Transall, Inc.

OTHER BULLETINS AVAILABLE VIA POSTAGE-FREE CARD ABOVE

(107) IF YOU USE, MAINTAIN OR SPECIFY WIRE ROPE, you want to have this guide to improved wire rope service, a new pocket size booklet on the "Use and Care of Wire Rope" now available from A. Leschen & Sons Rope Co., St. Louis 12, Mo. The booklet contains 72 p of practical information on proper methods of handling, reeving, breaking-in, splicing, cutting, lubricating, and specifying wire rope, with over 50 illustrations and 32 diagrams and charts. Write in No. 107 on the postage-free card above for Booklet C-51.

(108) COAL-RECOVERY DRILLS — New 4-p bulletin containing production facts and specifications of new McCarthy coal-recovery drills now is available from the Salem Tool Co., Salem, Ohio.

(109) GERMAN COAL PLANER (shown in operation on p 76 of this issue) is described in detail in two booklets now available from the U. S. representatives, Mining Progress, Inc., Highland Mill, N. Y. Westfalia Bulletin 1 describes the design and operation of the Loebbe Hobel coal planer, its mining efficiency and preparation for its installation. Bulletin 2 is a research report on the operation of the motor drives for the planer's conveyor system.

(110) ELECTRICAL EQUIPMENT for the mining industry made by the Westinghouse Electric Corp., Pittsburgh 30, is outlined in Bulletin B-5795, "A Planning Guide for the Selection of the Right Electrical Equipment." The folder describes and illustrates the various bulletins available on the different types of equipment and serves as a helpful guide in obtaining detailed information on many products.

(111) FROTH FLOTATION applied to the recovery of coal is the subject of Bulletin F10-B65, "Recovery of Fine Coal by Flotation and Tabling," offered by the Denver Equipment Co., Denver 17, Colo. The bulletin is a resume of the coal-flotation plant at the Fidelity mine, United Electric Coal Cos., DuQuoin, Ill., with a description and flowsheet.

(112) PORTABLE POWER CABLES—28-p Bulletin 152 offered by the Collyer Insulated Wire Co., Pawtucket, R. I., includes construction details, sizes, specifications and capacities of various types and styles of cable. Described are unshielded power cables, shielded high-voltage cables, welding cables, remote-control and drill cords, etc.

(113) HARDFACING GUIDEBOOK for the rebuilding and hardsurfacing of all types of heavy equipment used in earth-moving, mining, etc., is available to maintenance men from the Stoody Co., Whittier, Calif. Called "Stoody Hard-Facing Guidebook," the booklet, which recently has been completely revised, has gone through a number of editions since its first publication and has received nation-wide distribution.

(114) MAINTENANCE AND REPAIR MEN will better understand the functioning and servicing of the Joy Magnetax control if they secure a copy of a new booklet offered by Joy Mfg. Co., Pittsburgh 22. The new booklet contains a complete description of this DC control for mining machines, plus wiring diagrams and operating, servicing and maintenance instructions.

(115) "FOR MORE PROFITABLE MINING," a booklet published by Armco Drainage & Metal Products, Inc., Middletown, Ohio, discusses Armco products designed for mining use, such as Flex-Beam guardrail, corrugated metal pipe, liner plates, retaining walls, Hel-Cor pipe, Multi-Plate pipe, Steelox

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THE EDITOR, COAL AGE

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buildings and welded pipe. Mine installations are illustrated.

(116) REAR-DUMP HAULERS — New 28-p booklet describing and picturing the LeTourneau Tournarocker, a rear-dump unit for off-road and highway hauling of dirt, rock, etc., has just been issued by R. G. LeTourneau, Inc., Peoria, Ill. Detailed data on design, operation and application of the Tournarocker, built in 9-, 18- and 35- or 50-ton custom-built capacities, is provided in the Bulletin TK-137 available on request via the postage-free card above.

(117) BRATTICE CLOTH—New Bulletin 952 now available from the American Brattice Cloth Corp., Warsaw, Ind., contains descriptions of seven kinds of brattice cloth used in mine ventilation and discusses the particular merits of each type.

(118) VIBRATING SCREENS—Bulletin 852 from Productive Engineering Corp., Chicago 12, provides full information on its line of Gyroset "Positive Eccentric Action" vibrating screens. Details of deck structure, mountings, efficiencies, capacities and sizes for the various units are included.

(119) EXPLOSIONPROOF MOTORS—12-p Bulletin 800 available from the Louis Allis Co., Milwaukee 7, Wis., covers its line of explosionproof motors, with details of the special features built into them, typical uses and many of the various electrical and mechanical modifications available.

(120) HYDRAULIC TORQUE CONVERTERS—Bulletin TC-649 describes Torcon hydraulic torque converters designed for a variety of medium-heavy applications and features a unit-size selection chart based on engine rpm and net horsepower as well as more comprehensive information on the purpose, application, construction and operation of these converters to shovels, cranes, draglines, road machinery, tractors, etc. The single stage three-element-type units described are said to combine a hydraulic torque converter and a hydraulic coupling while retaining the advantages of both. Bulletin offered by Torcon Corp., Ashtabula, Ohio.

(166) METALIZING FILM—A 16-mm sound-film in full color, running time 28 min, shows various industrial uses of sprayed-metal coatings to prevent corrosion and sprayed-metal build-up of worn parts to salvage these parts at a fraction of replacement cost in many instances. Produced to promote a broader understanding of metalizing, the film is offered for showing to industrial, professional and educational groups. Full details available from Metallizing Engineering Co., Long Island City 1, N. Y.

(121) FRAME-TYPE CENTRIFUGAL PUMPS designed to handle most ordinary pumping jobs requiring capacities up to 500 gpm and heads to 135 ft are described in new Bulletin 52B6691A issued by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Built for V-belt drive, the frame-type pump, available in three types, can be mounted in a variety of positions and connected to any type of prime mover without difficult alignment problems. Head and capacity can be changed by simply altering sheave size on the V-belt drive, it is said.

(122) BOTTOM-DUMPS AND LOADERS—Euclid Road Machinery Co., Cleveland 17, has issued a revised 16-p folder detailing the features and general specifications of the 13-cu yd Models 70 and 71FDT-80W Euclid bottom-dumps and a single sheet covering the 9 and 10BV Euclid loaders.

(123) MOTORS AND CONTROLS—Quick-reference Bulletin A-2703, describing and illustrating its principal products, has been issued by the Reliance Electric & Engineering Co., Cleveland 10. Capsule digests included cover Reliance "Precision Built" AC motors from ¾ to 300 hp; heavy-duty Type T DC motors from ¾ to 1,000 hp; the all-electric Reliance adjustable-speed (V-S) drive for AC circuits from ¾ to 300 hp; electronic controls and regulators for this motor-drive system; and Reliance M-G sets, generators and rotating-type regulators.

(124) CENTRIFUGAL PUMPS—Ingersoll-Rand Co., New York 4, has released a new Bulletin 7223 covering general-purpose centrifugal pumps of the cradle-mounted type, with capacities of 5 to 2,400 gpm and heads from 10 to 500 ft. The bulletin covers five basic cradle groups and 17 corresponding pump types, with their capacities, horsepower ratings and uses.

(125) SHOVELS — Catalog F-143 describing the Model 75A and 75B ¾-yd standard and heavy-duty shovels and the 75BT 20-ton truck crane has been issued by Gar Wood Industries, Inc., Findlay Div., Findlay, Ohio. In covering their construction and operating features, the catalog also points out the ability of the 75's to hoist, swing and travel simultaneously, with the independent chain crowd as one of the features which reduces conversion time.

(126) PIPE MOLDINGS, extrusions or fabrications available in its "Indestructible" plastic are described in booklet offered by New York Belting & Packing Co., Passaic, N. J. Featuring toughness and high impact strength without sacrificing stiffness, the plastic can be processed to produce different properties within a considerable range and is non-contaminating, odorless, tasteless, nondiscoloring and shatterproof, with excellent chemical resistance, the maker says.

(127) WIRE CLOTH—Multi-Metal Wire Cloth Co., Inc., New York 59, offers a 126-p catalog detailing specifications, features and applications of its line of wire cloth, filter cloth and fabricated metal products. The catalog shows various types and sizes of cloth available and illustrates a wide range of metal parts and equipment made in its fabricating shop. A technical-data section discusses characteristics of various metals and alloys, with other data and tables.

(128) COMPRESSORS — Heavy-duty package types of Feather Valve compressors from 75 to 350 hp are featured in a new Bulletin L-676-B1 published by the Worthington Corp., Harrison, N. J. The bulletin includes an illustrated discussion of the construction, design and application.

(129) FIRE-FIGHTING HOSE NOZZLE—Bulletin C-501 from the Rockwood Sprinkler Co., Worcester 5, Mass., discusses the construction and application of its SG-45 lightweight triple-action WaterFOG nozzle, said to be instantly adjustable to high- or low-velocity water fog or straight stream to provide faster control of fires in both ordinary combustibles and flammable liquids with less water.

(130) TRUCK HOISTS—Series of 15 technical data bulletins describe the complete line of Galion hydraulic hoists with full specifications for each individual hoist, including hoist type, weight, stroke, cylinder diameter, mounting height, dump angle, piston-rod diameter and capacities. Offered by the Galion All-steel Body Co., Galion, Ohio.

(131) WIRE-ROPE CATALOG DIGEST—24-p booklet condensed from the Edwards general catalog is intended to provide wire-rope users with a concise easy-to-read guide to various phases of wire-rope production, purchasing, maintenance and use. Wire-rope construction, installation, lubrication and attachment of fittings are among subjects covered. Available from E. H. Edwards Co., Butler Rd. & Industrial Way, S. San Francisco, Calif.

(132) VALVES—Bulletin from the Rockwood Sprinkler Co., Worcester 5, Mass., covers design, operation and specifications of the Rockwood Full-Flow ball-type leakproof valves said to handle fluid stream without creating turbulence and available for ½- to 2-in piping at 300 psi.

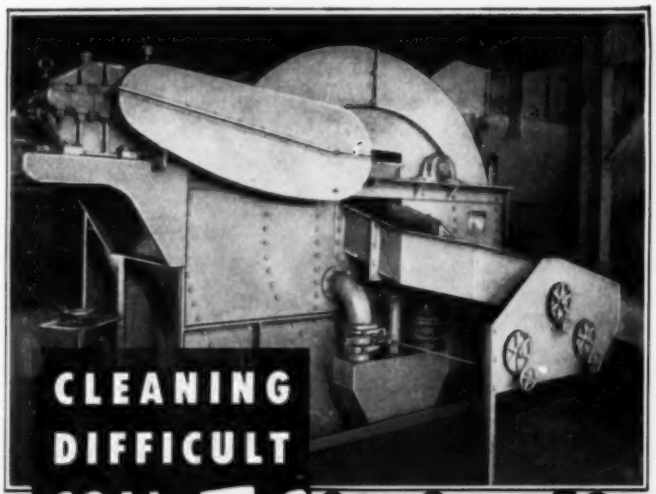
(133) PORTABLE TACHOMETERS—Data sheet 48 HJK from the Metron Instrument Co., Denver 9, Colo., offers design and application data on three of its units built for making high-accuracy speed measurements with precision and convenience otherwise unavailable in a small, portable, continuously indicating instrument. Inherent stability, ruggedness and simple calibration insure sustained accuracy, even when operated under adverse conditions, the maker says.

(134) "HOW TO OPERATE A LIFT TRUCK" is a 24-p booklet prepared by Hyster Co., Portland 8, Ore., for training operators in the interests of safe and efficient lift-truck operation. Slanted for both the beginner and experienced operator, the booklet also covers preventive maintenance, safety and basic materials handling, and includes drawings for setting up an obstacle course.

(135) BUSINESS TELEPHONE SYSTEMS—If communications between various properties and offices is a problem, you may be interested in how the Union Oil Co., Calif., uses its own private "inside" P-A-X business-telephone network to bring increased efficiency and close control to its operations, as described in a new brochure released by Automatic Electric Co., Chicago 7.

(136) INDUSTRIAL TRUCKS AND CRANES in its line are covered by Catalog 54 offered by the Baker Industrial Truck Div., Baker-Raulang Co., Cleveland 2. Including specifications and selection guide, the booklet details Baker fork-truck models from 1,000- to 10,000-lb capacities; high- and low-lift platform trucks in 6,000- and 10,000-lb capacities; crane trucks in 6,000- and 10,000-lb capacities; and Baker's 2000-lb capacity utility truck.

(137) BUILDING MAINTENANCE—Stonhard Co., Philadelphia 23, offers a 48-p manual, "Over the Rough Spots," which describes application of its products to patch holes or resurface any type floor simply and quickly, solve water seepage in underground foundations, repair leaky roofs, preserve concrete or wood surfaces and protect structural steel from rusting.



CLEANING DIFFICULT COAL *Efficiently*

If you are experiencing difficulty cleaning your coal efficiently, then investigate the NELDCO Dense Media Coal Cleaning System. Washeries in this country and in Europe are enjoying the benefits of higher yields of suitable clean coal from the run-of-mine product, simpler plant operating conditions, the inherent adaptability to changes in the quality of raw coal mined without the impairment of standards for clean coal quality.

STANDARDIZED PLANTS 50 TO 325 TONS PER HOUR

Standardized Coal Cleaning Plants in six sizes—capacities 50 to 325 tons per hour. Send for Book No. 152.

CUSTOM-BUILT PLANTS ANY SIZE — ANY CAPACITY

If you prefer a custom-built plant we can design and build an operation to suit your specific requirements.

Let us show you how the NELDCO Dense Media System will clean coal within any size range between 10" and ¼", eliminate hand-picking, make your coal a better product and get a better market price.

Whether you produce a small or large volume of coal we shall be very glad to tell you more about the NELDCO System.

NELDCO

NELSON L. DAVIS COMPANY

DESIGNERS AND BUILDERS OF COAL CLEANING PLANTS USING THE DENSE MEDIA PROCESS

343 SO. DEARBORN ST., • CHICAGO 4, ILLINOIS

Stoody Alloys save shovel parts!

Hard-Facing restores life at a fraction of new part cost!

You can get new and longer life from worn shovel parts by hard-facing with Stoody Alloys! Cost of reclamation is far less than for new parts. Regular maintenance procedures thereafter save costly down-time, spare parts inventory and needless replacements.

Check your shovels today against the suggested rebuilding operations pictured at the right. Detailed manual procedures are described in the new revised STOODY GUIDEBOOK. Get it from your Stoody dealer or by mail.

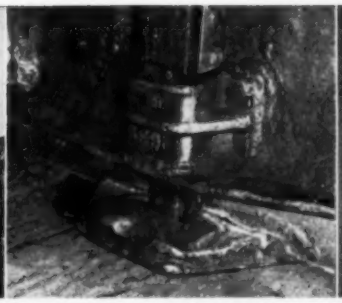
Custom welding shops equipped to handle automatic rebuilding work are located in every section of the United States and Canada. Write for list of shops near you.

1 BUCKET TEETH, LIPS, SIDES, BOTTOMS

ALLOY: *Stoody Self-Hardening 21 or Stoody 1027.*

APPLICATION: *Manual—stringer beads or solid overlays on wear areas.*

RESULTS: *Maintains size, reduces wear, retains full bite and load.*



2 LATCH PLATES AND KEEPERS

ALLOY: *Stoody Self-Hardening or Stoody 1027.*

APPLICATION: *Manual—build to size and peen to shape while red hot.*

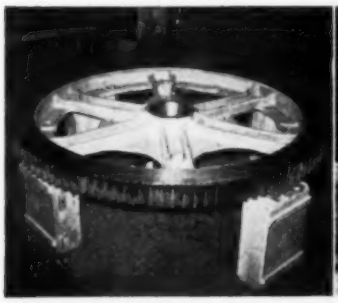
RESULTS: *Effects positive latch closure. Negligible cost.*

3 SHEAVES

ALLOY: *Stoody 104 or Stoody 107.*

APPLICATION: *By automatic—machinable deposit.*

RESULTS: *Prevents grooving, increases rope life.*

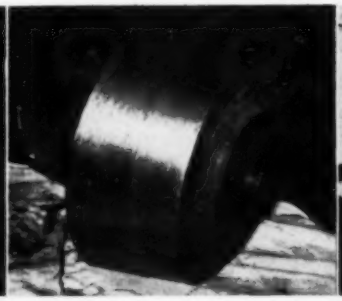


4 HOUSE BASE RINGS

ALLOY: *Build up with Stoody 104, finish with Stoody 107.*

APPLICATION: *By automatic—machinable surface.*

RESULTS: *Reclamation ¼ of new ring cost.*



5 HOUSE ROLLERS

ALLOY: *Stoody 107.*

APPLICATION: *By automatic—machinable surface.*

RESULTS: *Restores contour, doubles life at 1/3 the cost.*

6 SHOVEL IDLERS AND ROLLERS

ALLOY: *Stoody 105.*

APPLICATION: *By automatic—no finishing necessary.*

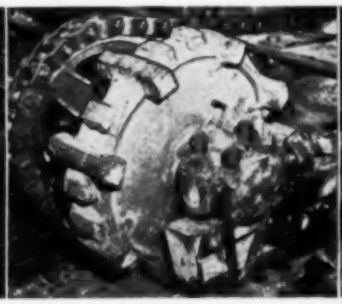
RESULTS: *Restores wearing faces, doubles life at ½ original cost.*

7 TRACK PADS

ALLOY: *Stoody 1027.*

APPLICATION: *Manual—rebuild with Stoody High Carbon, overlay with Stoody 1027.*

RESULTS: *Doubles life at ½ cost.*



8 DRIVING TUMBLERS

ALLOY: *Coated Stoody Self-Hardening or Stoody 1027.*

APPLICATION: *Manual—rebuild drive lugs.*

RESULTS: *Doubles life at ½ original cost.*

9 SWING BRAKE DRUMS

ALLOY: *Stoody 106.*

APPLICATION: *By automatic—machine to finish.*

RESULTS: *Illustrated type reclaimed for 15% of new cost, outlasts new drum.*

See the "yellow pages" in the phone directory for your local Stoody dealer, or write for dealer list and complete literature

STOODY COMPANY

11943 E. SLAUSON AVENUE, WHITTIER, CALIFORNIA

They "lifted" an

One of three Schramm Portable Air Compressors on the job.

Once a section of the Lackawanna River—now an open pit mine of the Booth Construction Company.

SCHRAMM AIR COMPRESSORS

A SIZE AND MODEL FOR ANY AIR NEED

entire river to get HIGH GRADE COAL!

Diverting the Lackawanna River and then mining the river bed is today being accomplished by the Booth Construction Company, Carbondale, Penna. This unusual task of "lifting" an entire river to operate an open pit mine has attracted widespread interest.

In operation for about three years, this mine has already produced over five hundred thousand tons of coal and indications point to a continuation on this large scale for at least five more years.

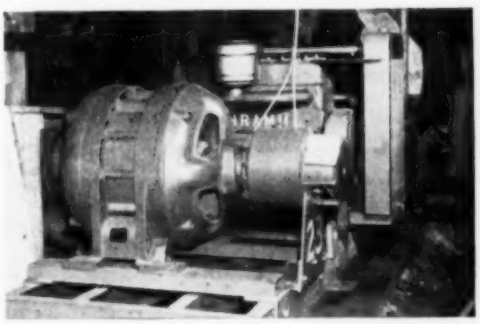
Schramm Air Compressors are very much in evidence on this job. Three stationary units include a 600 c.f.m. diesel engine drive and two motor driven 420 c.f.m. compressors installed in a small work shed. In addition, three portable Schramm Air Compressors are used on new developments and for providing air in sections that do not warrant extension of pipe lines. The portables include a 600 c.f.m., a 315 c.f.m., both diesel engine drive, and a 105 c.f.m. gasoline engine drive.

You, too, will find many uses for Schramm Air Compressors around your mine. For data on Schramm's complete line of air compressors, write us today.

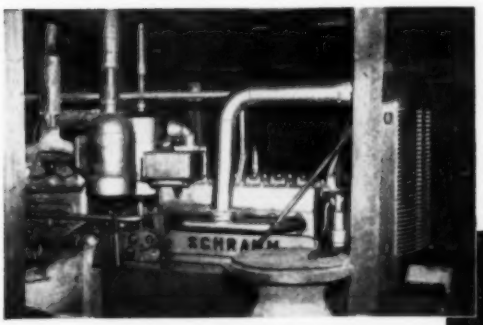
SCHRAMM, INC.

The Compressor People

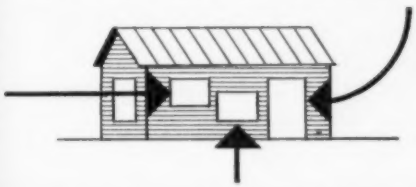
WEST CHESTER • PENNSYLVANIA

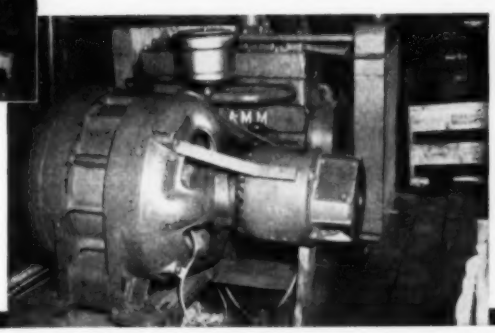


420 C.F.M. V-Belt Motor Driven Schramm Air Compressor



600 C.F.M. Diesel Engine Driven Schramm Air Compressor





420 C.F.M. V-Belt Motor Driven Schramm Air Compressor

GREASING CUT 75% WITH SUN LUBRICANTS

Since switching to Sun 301 and Sun #7 Mine Car Greases, Island Coal Company, Poland, Pa., has reduced maintenance on its mine car wheels by 75%. Previously, all wheels were greased every two or three days. Now, wheels with plain bearings are greased once a month. Wheels with roller bearings are greased every four to six months.

Better lubrication proved beneficial in other ways too. A mine locomotive now hauls 18 instead of 15 loaded cars from the mine per trip. Where they have to be moved manually, cars roll easier. Before, it was often necessary to bump them with another car and keep them moving by hand. Now, they can be started with a push and will keep rolling without effort.

From face to tipple, there's a Sun Lubricant to help keep your mine operating at maximum efficiency. Services of a Sun representative are available upon request. Write SUN OIL COMPANY, Philadelphia 3, Pa. Address Dept. CA-11.

CORRECT GREASES REDUCE COSTS. Sun 301 Mine Car Grease for roller bearings and Sun #7 Mine Car Grease for plain bearings have helped lower maintenance and lubrication costs because these Sun products have to be applied less often.

18 LOADED CARS CAN NOW BE HAULED. Before the change to Sun greases, maximum number was 15 cars.

CARS ROLL SMOOTHER AND FASTER into tipple. Sun greases prevent the sluggishness that was formerly a problem.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

NEWS Round-Up

Lewis Blisters WSB As Miners Walk Out

BULLETIN—Miners moved slowly back to work Oct. 27 at Mr. Lewis' urging after a dramatic Sunday evening meeting at the White House attended by Mr. Lewis, Mr. Moses and Economic Stabilizer Roger Putnam. At the 24-min talk with the President, Mr. Moses reportedly pledged prompt payment of the WSB-allowed $1.50 and said the remaining 40¢ would be held in a special fund pending WSB action.

The President said Mr. Lewis pledged cooperation in getting production started.

Following the White House meeting, Mr. Putnam denied he had made any "deal" and predicted no final decision before Election Day.

JOHN L. LEWIS tore into the Wage Stabilization Board Oct. 21 for lopping 40c off the daily wage rise he recently negotiated with bituminous operators. As he joined battle with WSB, miners streaming from the pits forced a virtual shutdown of the industry that threatened to stretch into a long strike.

Defense Solid Fuels Administration straightway clamped an embargo on shipments from mines under contract with the union as Mr. Putnam and Defense Stabilizer H. H. Fowler voiced approval of WSB's decision.

The nearly total walkout followed scattered shutdowns earlier in the month, when miners failed to find the $1.90 rise in their pay envelopes. Operators had been warned not to pay the increase pending WSB action.

WSB handed down its decision Oct. 18 after a bitter fight that split the board 8 to 4, labor members dissenting. WSB Chairman Archibald Cox, writing the opinion for the public members, argued that $1.05 was allowable as a cost-of-living increase and that an added 45c was permissible "to maintain proper wage relationships and prevent hardships and inequities." If WSB allowed the full $1.90, he contended, "The American people would quickly perceive that we had used flimsy excuses to justify a wage increase actually greater than any consistent with an honest stabilization program . . . The real issue in this case is whether we shall abandon the fight against inflation."

Mr. Lewis loosed his full measure of scorn on WSB for whittling down the wage rise. Steadfastly ignoring the authority of WSB, he addressed his remarks to Harry M. Moses, president, Bituminous Coal Operators' Association, who had asked him to send the miners back to work following WSB's ruling. Mr. Moses pledged payment of the $1.50 retroactive to Oct. 1.

In his letter to Mr. Moses, Mr. Lewis said the miners would return to work when the operators honored their contract in full. Mr. Lewis wrote: "We have a contract. It is with your association. It is complete. It speaks for itself. You signed it. It was negotiated in the American way—through collective bargaining. It is as pure as a sheep's heart."

Turning to WSB, Mr. Lewis continued: "Naturally, miners resent such attempted thievery . . . They have children. Children need milk. The 40c would buy milk each day . . .

"The procedure invalidates collective bargaining, substitutes compulsory arbitration and would make economic serfs of American citizens. The representatives of labor upon the board may yet be heard from on this subject . . .

"If you do not like the contemptible action of the NAM labor baiters and the little Harvard professor and his quavering trio, appeal and ask for review and reversal. You (Mr. Moses) are the sole petitioner and plaintiff . . ."

WSB labor members in a statement Oct. 22 argued that the board could have approved $1.10 over and above the approved $1.50 in lieu of fringe benefits the miners do not enjoy, such as paid holidays and bigger vacation payments. Such concessions would have been in line with action in other WSB cases, labor members said.

No immediate crisis loomed in coal supplies. Stockpiles stood about where they did Sept. 1, when utilities held an average of 138 days' supply; coking ovens, 60 days; steel and rolling mills, 67 days; cement mills, 74 days; and railroads, 39 days. Tightest spot was retail yards, with 10 days' supply.

HARDY PERENNIAL!

Also Featured in This Section

First enforcement federal safety law, p 132
UMWA says: "Forward With Lewis", p 134
News Briefs and Trends on pp 132, 164 and others . . . Personal Notes on p 142 . . . Association Activities, p 144 . . . New Mine Developments, p 154 . . . Preparation Facilities, p 160 . . . New Books for Coal Men, p 170 . . . Among the Manufacturers, p 179.

News Briefs and Trends

Federal Mine Closings Reported As Review Board Holds First Hearings

The temporary closing of two mines and the classification of another as gassy were reported last month as the first examples of compulsory safety enforcement under the new Federal Coal Mine Safety Act passed by Congress last summer. The newly activated Board of Review provided under the Act for appeal from the USBM's rulings held its first hearing Oct. 17, considering an appeal from the gassy classification. Both the closed properties were re-opened within a few days, following correction of the violations and approval by the USBM.

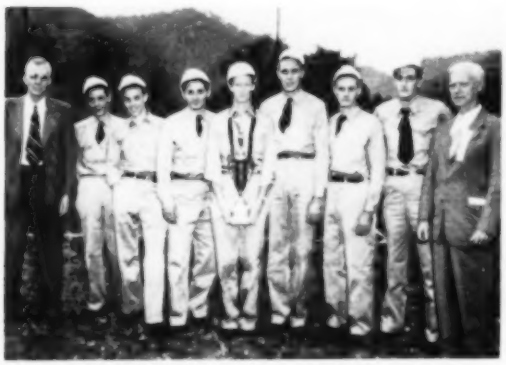
In one case, a federal inspector Oct. 13 closed a part of Mine No. 9, Hutchinson Coal Co., Hutchinson, W. Va., because of inadequate ventilation. Leaky stopings were repaired immediately and director of the Bureau, after a special 3-man re-investigation, okayed re-opening of the area by that weekend. On Oct. 6, the Bureau closed the Langeloth mine of the Dominion Coal Co., Slovan, Pa., because of insufficient roof and rib support. The company appealed the decision to the Board of Review, but by the time the appeal had reached the Board the condition had been corrected and re-opening of the mine approved, so that the board consequently dismissed the appeal. In the classification case heard by the Board Oct. 17, the Morrisdale Coal Co. appealed the federal ruling of its Maxton Slope No. 1 mine as gassy. The company did not dispute the accuracy of the air sampling, in which three out of four samples showed less than .0025 methane and one sample indicated .0044, but maintained that the Act should provide for reclassification if warranted by a later re-examination. The Bureau said that no such procedure is provided for now, and the board upheld the classification in its findings announced later. It was understood that the company had been operating the property on a gaseous basis but had objected to the formal classification, since a connection between its Nos. 1 and 2 mines would make it necessary to operate the latter as gaseous also.

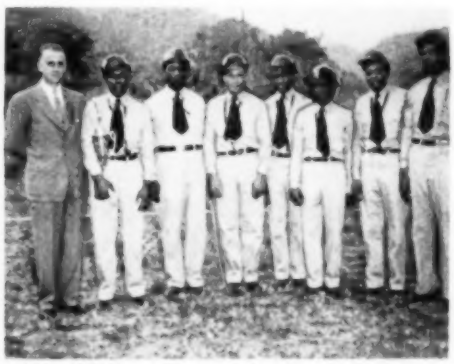
Earlier, on Oct. 8, the USBM announced that it and the State of Wyoming had entered into the first state-federal cooperative plan for the inspection of coal mines as authorized by the new safety law. Under the plan, state and federal inspectors will make their inspections jointly, unless prevented by an emergency, and the state inspector will sign all federal orders and findings, or indicate his refusal and the reasons thereof. In case of disagreement under this plan, the operator, state or federal bureau may apply to the U. S. District Court for appointment of an independent inspector and the findings of any two inspectors will govern. J. J. Forbes, Bureau director, said all states had been requested to submit such plans and that he hoped they would do so. A number of state plans were expected to be submitted for approval shortly, he reported.

Power Set for Atomic Plants

The Atomic Energy Commission Oct. 15 approved an agreement with the newly formed Ohio Valley Electric Corp. to supply the 1,800,000-kw demand of the

(*Continued on p 164*)





FIRST-AID WINNERS at the annual safety day of the Kanawha Valley Mining Institute were teams of the Carbon Fuel Co., Carbon, W. Va. (left) and the Semet Solvay Div., Allied Chemical & Dye Corp., Longacre, W. Va. Included in the Carbon Fuel team photo are: H. A. Jones (left), general superintendent, Tony Billanti, Larry Billanti, Tony DeRaimo, Lee Stanley, Charles Hossler, Louie DeRaimo, William Blake, and Joseph Bierer, acting chief, W. Va. Department of Mines. Shown in the Semet-Solvay photo are: C. V. Hunt (left), superintendent, John Owens, captain, Emmitt Dunkley, Fred Washington, David Bolen, Floyd Booker and Aaron Banks

Kanawha Valley Holds Annual Safety Day

MINE SAFETY was the main feature at the 21st annual Safety Day sponsored by the Kanawha Valley Mining Institute at Montgomery, W. Va., Sept. 20.

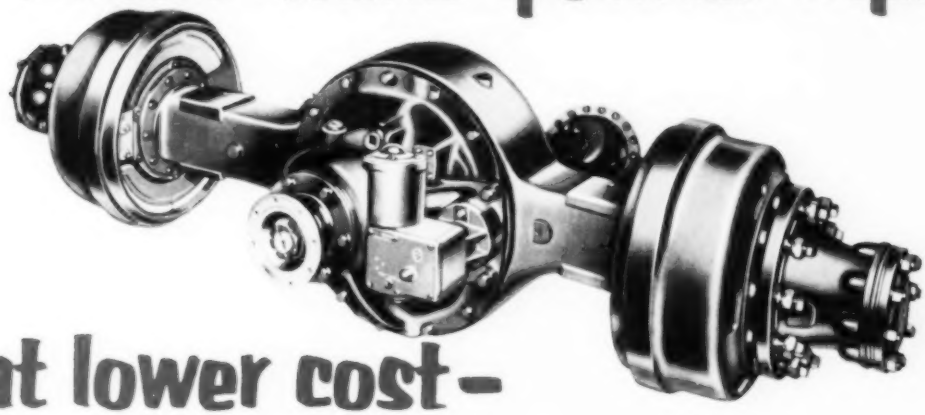
Top honors in the white division of the first-aid contest went to the team from Carbon Fuel Co., Carbon, W. Va. Placing first in colored men's competition was the Semet Solvay Div., Allied Chemical & Dye Corp., Longacre. Second and third in the white division were taken by the teams from Electro Metallurgical Div., Carbide & Chemicals Corp., Alloy, W. Va., and Cannelton Coal & Coke Co., Cannelton. Second and third in the colored division were won by Carbon Fuel Co., Carbon, W. Va., and the Electro Metallurgical Div. Individual prizes to team winners were $50 for first place, $25 for second place and $20 for third place. Cups were awarded to the winning teams by the Mine Safety Appliances Co.

First and second places in the boys' competition were won by the American Legion Post No. 38, Montgomery, W. Va., and the Semet Solvay Div., Allied Chemical & Dye Corp., Longacre. First prize in the girls' section went to Cannelton Coal & Coke Co., Cannelton.

The day's program, starting at 11:30 am, included aerial acts, parade, address of welcome, first-aid contest, vaudeville shows, banquet and drawing for prizes to contributors.

Joe Mulligan, safety director, Semet Solvay Div., directed the meet. Rush Meadows, president of the Kanawha Valley Institute, sponsor of the meet, was general chairman. Chief judges were Frank J. Furin, J. W. Pero and James H. Forgie.

EATON 2-Speed equipped Trucks make quicker trips



at lower cost– last longer, are worth more on the trade-in

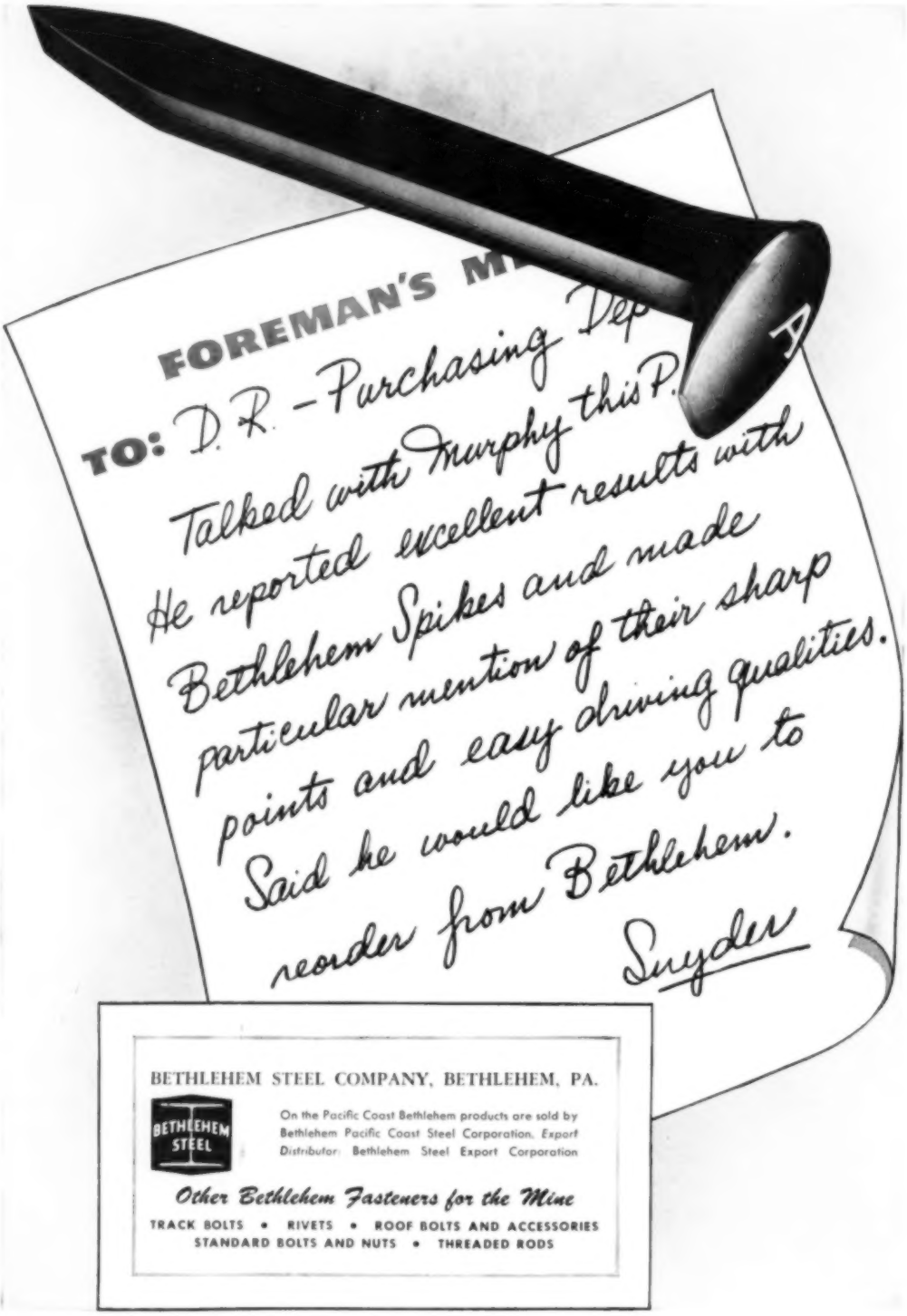
With Eaton 2-Speed Axles drivers select the gear ratio best suited to road, load, and traffic conditions—the ratio for maximum economy, safety, and maneuverability. Quicker trips with full loads mean more payload miles at lower cost per mile. Engines run in the most efficient and economical speed range, reducing stress and wear on engines and all power transmitting parts. Trucks stay on the job, out of the repair shop. Thousands of miles are added to vehicle life; trucks are worth more when they are traded in.

Let your truck dealer explain how Eaton 2-Speeds will enable your trucks to haul more, faster, longer, at lower cost.

EATON *2-Speed Truck* AXLES

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

Today, America's roads are crowded with twice the traffic they were designed to carry. Help end the national traffic jam by speaking up for more and better roads.


FOREMAN'S M
TO: D. R. – Purchasing Dep
Talked with Murphy this P.
He reported excellent results with
Bethlehem Spikes and made
particular mention of their sharp
points and easy driving qualities.
Said he would like you to
reorder from Bethlehem.
Snyder

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Other Bethlehem Fasteners for the Mine

TRACK BOLTS • RIVETS • ROOF BOLTS AND ACCESSORIES
STANDARD BOLTS AND NUTS • THREADED RODS

NEW FACTORY-SEALED IDLER

TIMKEN® bearing equipped Continental idler can be re-lubricated

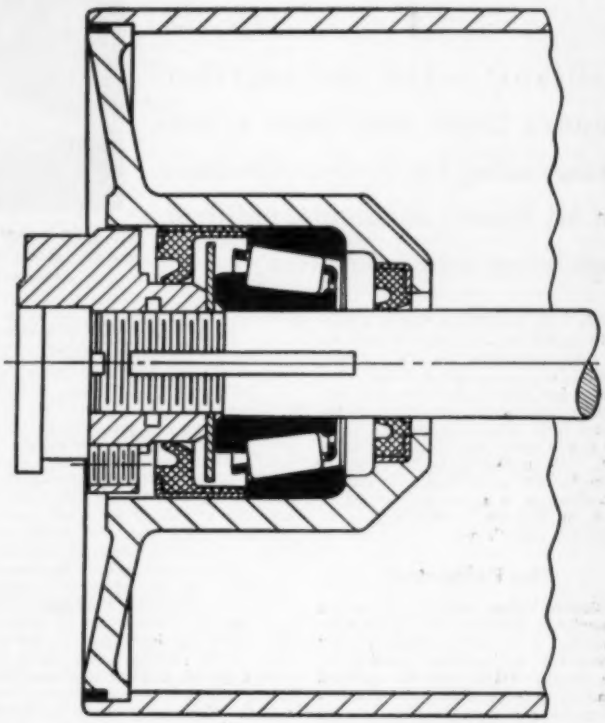
THE Continental Gin Company reports that its new type UST idler, lubricated and sealed at the factory, will stay in top operating condition for years at a time—*without re-lubrication!* Yet, should working conditions demand, it *can* be re-lubricated right on the job with the roll in place! Continental engineers say: "When seals or lubricant are no longer effective, the idler and bearings are still good! The entire unit can be disassembled, seal replaced if necessary, lubricant renewed, and put back in service to add still more years of trouble-free service to its operating life."

To insure long life and keep maintenance costs down, Continental specified Timken® tapered roller bearings for its new type UST idler. Because Timken bearings keep idler shafts concentric with housings, closures are made more effective. Lubricant is retained, dirt and moisture kept out. Operation is more economical.

Timken bearings have exceptional load-carrying capacity because of line contact between rollers and races. And due to their tapered construction, Timken bearings carry both radial and thrust loads in any combination.

Because of their true rolling motion and extremely smooth surface finish, Timken bearings reduce friction and wear. Idlers turn freely, easily. Belts last longer.

No other bearings give you all the advantages of Timken bearings. Specify them for the machines you build. Make sure they're in the machines you buy. Always look for the trademark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



How **CONTINENTAL GIN COMPANY** mounts its new UST idler on Timken bearings to insure minimum maintenance and long life.

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL AND THRUST ▭ LOADS OR ANY COMBINATION

"Forward With Lewis!" . . . UMW Theme

Militant union get-together honors Lewis and maps a program calling for further advances on all fronts: economic, political, legislative and otherwise

Wide World

NO LIFE TERM FOR HIM—Still the miners' darling and the star of the show, John L. Lewis declined offer of lifetime presidency at 41st UMW convention.

WITH THE KEYNOTE that of a militant organization still battling enemies on all sides – operators, financial interests, government, hostile state legislators and, even, other labor leaders–the 41st consecutive constitutional convention of the United Mine Workers of America, meeting at the Music Hall, Cincinnati, Ohio, Oct. 7-15, reaffirmed in no uncertain terms its faith in its leadership and its determination to go forward toward its goals on all fronts: economic, political, legislative and otherwise.

The Delegates

Wearing badges that were outstanding examples of the jeweler's art, the delegates had a solid-citizen look, trending more toward the increased circumference, the grizzled thatch and the polished dome of maturity, though there was a substantial representation of the younger set with thinner silhouettes, ample hirsute adornment and the bounce of youth. All had the assurance of those who have arrived and are a part of an eminently successful organization with money in the bank–$34,032,833.48 on July 1, 1952, against $13,184,854.07 on June 30, 1948, the year of the last convention.

They were sober, attentive and restrained in their after-hours revelry. Their interest was primarily in what Lewis had to say, in money and direct benefits now and in the future, and in running their own affairs. They were proficient in "hollering"–the art of using the tongue to bludgeon, confuse and persuade. However, they left to Mr. Lewis and the high union brass the major pyrotechnics: the withering sarcasm, the 2-ton epithet, the massive malediction and the piledriver denunciation.

The Champ

There was no question but that the United Mine Workers of America also was the United Mine Workers of John L. Lewis.

Wearing either his special enamel-and-gold officers' badge or the less-ornate delegates' badge on his left lapel, planted solidly in his special polished-leather swivel chair with scuffed left armrest, regarding a splashed left hand from a half-upset water glass with weary patience, pacing the rostrum to frame his next oration while the routine business of the convention droned along, grinning when a Kentucky miner's telegram added the Democratic Party to the list of those from whom all blessings flow, holding levee on the platform, autographing his photograph for admiring members, thundering forth at his enemies, lashing them with the whiplash of scorn or cooing like the suckling dove, Lewis was the convention, with all other things more or less routine.

The attitude of the delegates was the smiling pride of lower-echelon executives in a leader who has met and bested all comers. They subscribed wholeheartedly to numerous tributes, such as the following by Adolph Pacifico, District 6 president, who raised the curtain on the convention:

"In every generation there are a few men who, because of some outstanding attribute, win the love and praise of all who know them. It is these men who raise the average of humanity and, by their words and deeds, improve the world about them. Such a man is our distinguished president, John L. Lewis. The story of his life is well known to all of you as well as to the world. His outstanding achievements are familiar to the entire labor movement, and in the hearts of countless millions of toiling men and women throughout the civilized world, as in the hearts of all of us, he has a warm place."

The delegates were perfectly willing to make Lewis president for life. He declined, saying:

"I certainly don't want the constitution committee to pass a resolution or adopt a rule of that kind. I just want the rules of the organization to apply to me just as they apply to every other member, and I will take a chance with you when the regular elections come around. . . . I would not like the convention to take any action which would enable the critics of our organization to proclaim that we were establishing a dynasty or kingdom."

From the welter of words during the course of the week-long meeting, the following emerged as some of the highlights:

The Operators

Lewis–"The operators yield slowly and they yield only under pressure. They don't offer improvements or reforms. Like all operators in America or England or abroad, they think backwards always."

Other Labor Leaders

Lewis–"Even now, if the leaders of the American Federation of Labor and the leaders of the CIO had the courage of a longeared jackrabbit looking at a redbone hound, they would withdraw their anti-Communist oath and let this damnable statute [Taft-Hartley] fall now by default. But I don't know how to pump any courage into the veins of these

sycophants who are willing to sell out the destiny of the labor movement and the future of its millions of members and their wives and families in this country for a lousy lunch or a pat on the back from some psuedo-politician in Washington."

Labor Unity

Attitude of other union leadership, said Lewis, makes unity impossible at this time. We can only hope, he concluded, that the men and women of the labor movement can in time make these officials act to achieve the desired goal.

Wages and Productivity

Lewis—"What the United Mine Workers may or may not do is of more importance, and the impact upon the individual members or their direct dependents affects the well-being of this country. It affects American productivity and, highly integrated as it is in this miracle age of science, it has more to do with the actual well-being of our political institutions, our free institutions of all character and our people, to maintain and preserve freedom in this country that any other factor that man may consider.

"That a great part of the world is in unrest is due to the economic misery that exists in some countries, their failure to adapt themselves to meet the maladjustments of their economy which create in turn the great social and great political questions which cause public upheaval and unrest.

"The United Mine Workers of America have been making a contribution to the economic well-being of this Republic of ours, and in so doing they are making a contribution to the advancement of the cultural factors that affect its institutions.

"Our union recognized that new value can come in our country and under our system of free enterprise only from new production and we encourage that new production. We stand for the usage of all modern equipment and scientific devices and forms that will take the raw materials which God gave our people and make them of increasing value in the marts of trade.

"We only ask and we will always ask our rightful participation in that new productive efficiency. That is the reason now that you will have a daily wage scale in the industry, as you have today, that is greater than the weekly scale many of us remember—and not very far back."

Welfare

Lewis—"Think of today without there being a welfare fund. I wouldn't permit and I wouldn't think our people would ever permit its being taken away. I have told the operators that they need never expect that the men who work in the coal mines in this country will ever again consider the elimination of the United Mine Workers' Welfare Fund. . . . The principle on which this welfare fund is written into our contract is in plain words for all men to see, and that principle declares that the men who own the coal mines in this country and who use up the manpower of our industry in these mines will pay the cost of that usage, and that the finished product, the commodity, the ton of coal that goes into the city bins, shall bear its share of the cost of caring for these men. . . . It is part of the cost and as far as I am concerned it will remain a part of the cost of production."

The delegates made it clear that they value the welfare fund. One evidence was the fact that around one-third of the resolutions offered dealt with welfare and other social security measures, with the resolutions practically unanimous in asking increased benefits. This brought this comment from Lewis:

"The welfare fund admittedly has not yet achieved perfection. Why? Chiefly because we have not had enough money to achieve perfection. Why don't we get the money? We are working on that."

Safety

Committee on Officers' Report—"We commend our international president and his associates for their efforts to eliminate fatalities and injuries which are caused by the greed of the coal-mine operators and their failure to furnish even a minimum of safety in the operation of their mines."

"Education in the prevention of accidents is without doubt the first step toward their elimination. We thank our international officers for providing a comprehensive safety course available to all members of our organization. We strongly endorse and realize the importance of this program, and each delegate should urge the acceptance of this program by his membership."

Congressman A. B. Kelley—"We had one satisfaction. That was to get a bill on the statute books because we can then look forward to amending it, and amending it so that it will do the job we all hoped it would do."

Five out of the 203 resolutions printed in advance either mentioned safety or were addressed to the safety problem, usually endorsing a stronger federal law.

Taft-Hartley

Lewis—"Mr. Taft . . . through the device of the iniquitous and oppressive statute that bears his name, has sought to rivet chains upon free American labor, to devise a modern bill of attainder to harass those citizens of our Republic who exercise their lawful right to join together in voluntary associations for the purpose of bargaining collectively with their employers; Taft, who has become known as the manservant of privilege in America and, with due apologies to Henryck Ibsen, an enemy of the people; Taft, who is the articulate zombie of predatory and oppressive wealth in America; Taft, of whom I think it is beyond human comprehension that an American with a child to rear and a wife to protect would ever deign to support for public office, or any other man whom Taft may lead around with a collar around his neck."

The preceding might be termed one of the milder statements made by Lewis in one of his longest and strongest sales talks to the delegates, precipitated by the reading of the resolutions on Taft-Hartley. The selling job ran for an hour and Lewis pulled out all the stops, perhaps because only seven out of the 203 resolutions in the printed list had anything to say about the subject. Boos, jeers and laughter punctuated his speech, though their tone apparently was without venom and more in the nature of the familiar "Kill the umpire!"

Politics

"It is the unanimous opinion of your resolutions committee that Adlai E. Stevenson and John J. Sparkman represent the ideals of the fearless, thinking coal miner who is free to reach his own conclusions and capable of making his own political decisions. The past record and present views of Governor Stevenson and Senator Sparkman indicate that labor's welfare and the preservation of our American institutions and living standards would be best served by electing these candidates."—Excerpt from resolution overwhelmingly adopted by the delegates Oct. 13.

Though later news (p 131) reversed it, the grapevine predicted that the resolution was slated for earlier presentation but was held up until Lewis had been assured by high administration officials in Washington that the last contracts would be approved—if not by the Wage Stabilization Board by Roger Putnam, Economic Stabilization Administrator. The initial lineup in WSB was reported as 10 to 8 against approving all of the increases. The inside dope was to the effect that if WSB was unable to approve Putnam would take over, in turn leading some dissenting WSB members to consider challenging Putnam's power.

Union War Chest

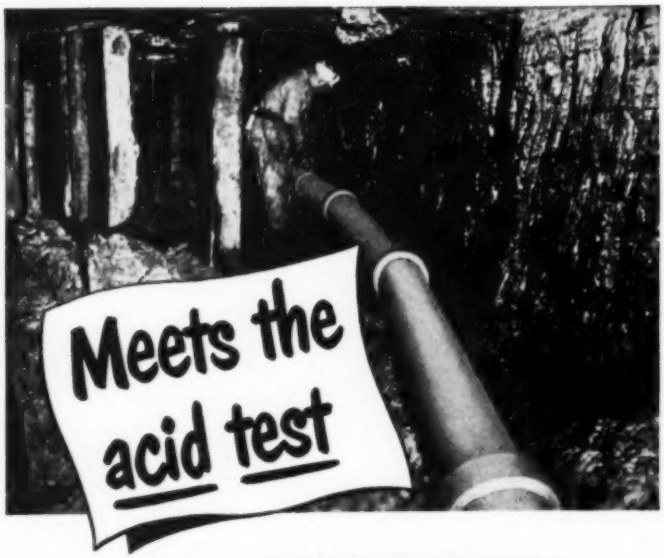
A $20 levy on all UMW members, to be collected in November and January, was voted Oct. 14, with only eight dissenters. The purpose was stated to be providing increased union strength in case of a depression and to enable it to withstand suits brought under the Taft-Hartley Act. Lewis had this to say in support of the resolution:

"You know, it is written somewhere that all who swing to the music shall participate in compensating the musicians at the union rates. If you want to translate that right now into American English, you might say that those who dance must pay the fiddlers."

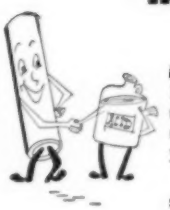
Competition and Markets

Committee on Officers' Report—"Sizing up the situation, it is easy to understand that further encroachments of natural gas on the bituminous and anthracite coal markets would have a terrific effect on the employment situation in the 28-state area where coal is mined in this country."

"We support and unanimously concur in the belief that every effort should be exerted by our officers to stop this government spending [for hydroelectric plants], which will detrimentally affect the employment in many localities and eventu-



...it's a TRANSITE PIPE mine drainage line!

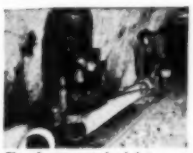


Many installations of Transite Mine Service Pipe have passed the rugged test of carrying acid mine drainage waters for fifteen years or more.

In many cases the corrosive solutions that attacked this asbestos-cement pipe day in and day out were so aggressive that they had "knocked out" ordinary pipe in a few months!

Mine operators have found that Transite Mine Service Pipe offers advantages in addition to long service life. It is light in weight and easily installed. Lines are quickly assembled, even in restricted mine passages—can be laid around curves without special fittings. Its tight joints stay tight in service. Tough and strong, it won't deform in use.

Available for working pressures up to 150 lbs. per sq. in. and in full range of diameters from 4" up, Transite is also the money-saving pipe for water supply lines, spray and return lines from condenser cooling towers, road culverts and fire prevention ducts for carrying sulphuric fumes and condensation. For further information, write for Brochure TR-51A. Address Johns-Manville, Box 60, New York 16, N.Y.



The factory-made joints are assembled with a simple coupling puller.

Curves can be negotiated with Transite Mine Service Pipe. Deflections up to 5° can be made at each joint.

Tough, strong asbestos fibres help give this pipe many of its outstanding qualities.

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TRANSITE mine service PIPE

Contract Aftermath:

Losing Shirt Was Enough . . . Moody Recovers Hat

Joseph E. Moody, president, SCPA, stepped into an elevator at UMWA headquarters after signing the new coal wage agreement. The operator was about to shut the door, when Moody checked him.

"Just a minute," quoth Moody. "I've forgotten my hat. I lost my shirt in there, but I've no intention of losing my hat."

He returned to the third-floor council room, while the elevator continued down.

The reaction of Harry M. Moses, head of BCOA, was somewhat similar. Fingering his tie, he observed: "Well, I see I still have my tie. But my shirt is up on the third floor."

—Quoted from *The News* District 50 and UCW, UMWA

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ally cause repercussions in the whole economic life of the nation."

"All efforts should be exerted to promote a program of this nature [synthetic fuels] in order to assure future commercial success and increased demand for coal."

Local Autonomy

"We don't need no autonomy." That declaration of policy by an Alabama delegate was enthusiastically accepted by the delegates after considerable skirmishing was brought to an end by a few hundred well-chosen words by Mr. Lewis, whose observations included the following:

"This convention is not going to change its policy or setup of the procedure of the organization simply because experienced delegates here have more sense. . . . You're doing all right aren't you? All right. Why listen to these young fellows who want to run for office so they can buy some land and dig around awhile and get their names in the paper."

Organization

Thomas Kennedy, vice president, in presenting the joint report of the international officers—"We are making progress and we shall continue to do so until the banner of this organization flies over every mine and every strip pit in the United States and Canada."

Seizure

John T. Jones, legislative agent—"We agree with the Congress and the courts that no man, no matter how high his position, has the right to seize a private industry to prevent an industrial dispute. We opposed the property-seizure amendment when offered as an amendment to the Taft-Hartley Act. We opposed its use in the recent crisis. And by the same token we oppose the right of Congress to pass a law that deprives the working people of America of a single vestige of their God-given liberties."

Practical Assistance

Whether it's a tight squeeze in a cookie jar or a bottleneck in your mining operations . . . practical assistance—the kind that solves the problem simply and fast—is your best answer. And ***PRACTICAL TECHNICAL ASSISTANCE*** is a *Cities Service specialty*.

Cities Service Lubrication Engineers can offer *practical assistance* that will eliminate bottlenecks caused by faulty lubrication . . . will mean dollars, man-hours and equipment saved. They're specialists in the industry's most effective lubricating practices. In addition, they offer the most complete line of Cities Service quality lubricants.

but check for yourself:

✔ Check on the high quality of all Cities Service lubricants. Ask critical users. Or better still, test them on the job.

✔ Check the complete Cities Service line for the correct lubricant for every need. Deliveries are quick—and dependable.

✔ And finally, discuss your problems with a Cities Service Lubrication Engineer . . . he's probably solved many like them for other mining operations. Write or phone CITIES SERVICE OIL COMPANY, Dept. K9, Sixty Wall Tower, New York City 5 . . . or get in touch with the office nearest you.

CITIES SERVICE

Big Red TD 24

Rips the Shale

RUSSELL CARROLL KNOWS Big Red is doing a dependable job: *"Our TD-24 moved in and has been on the job continuously, clearing the strip."*

International Power Works 10 Tough Hours a Day for V.H. Carroll Construction Company of Canton, Illinois

A 5½-foot vein of No. 5 coal is worth stripping, even if you have to gouge down 50 feet for it. But it takes strong, tough equipment to do it.

For V. H. Carroll Construction Company, Canton, Illinois, that means Big Red, the rugged TD-24—to rip up the shale and shove it over to the spoil piles, or scrape it into heaps for the dragline bucket.

The versatile TD-24 also clears land for the dragline, pushes trucks, levels spoil piles, and cleans up after the stripping. Big Red plays a big part in this 500-ton-a-day job. Russell Carroll puts it this way: *"It takes a powerful tractor to cut thru' this shale, rip it out, then push a big load to the spoil pile. Our TD-24 sure is doing a swell job for me."*

See your International Industrial Distributor for on-the-job proof of top performance and day-after-day endurance. Find out about his full stock of parts, his factory-trained mechanics. You'll be a TD-24 man from there on in!

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

INTERNATIONAL **POWER THAT PAYS**

You can do it, too . . . with Pure Oil Industrial Lubricants

At one fell swoop, you can cut your inventory . . . cut your costs . . . cut your problems . . . with Pure Oil's complete line of industrial lubricants.

Many of these top-quality oils and greases, you see, are designed to do several *different* jobs instead of one specific job.

And to do each job *equally well.*

This enables you to do *all* your lubricating with *fewer* lubricants. In other words, you can

simplify and save . . . with Pure Oil Industrial Lubricants

THE PURE OIL PURE COMPANY, U.S.A.

Be sure with Pure

If you would like to swing a sharp axe on *your* lubricating costs (and who wouldn't, things being what they are!) write: The Pure Oil Company, Industrial Sales, 35 E. Wacker Drive, Chicago 1, Illinois.

Another FIRST

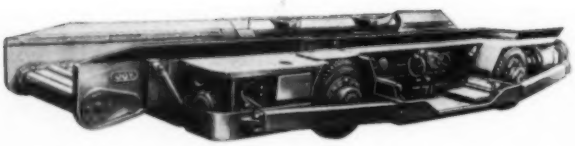
12-RB CUTTER

A rubber-tire mounted, mobile, fast-tramming cutting machine only 26" high, supplied either as a bottom or top cutter. For slabbing, the cutter bar swings 90° to either side. Bar tilt, roll, and lift are fully hydraulically controlled. Hydraulic steering provides extra flexibility for easy maneuvering. 50 HP cutter motor provides ample capacity to keep ahead of the loader; separate motor drives the hydraulic pump.

20-BU-1 LOADER

Overall height is only 24", yet this machine can load up to 8 tons per minute. Employs the exclusive JOY loading principle, also a new JOY development: the conveyor is driven independently of the gathering arm drive. This makes possible continued operation of the gathering head while a shuttle car is away, to provide a fully loaded conveyor for quick loading of the car when it returns. Also permits continued loading even when gathering arms are momentarily stalled with hard digging.

8-SC SHUTTLE CAR



Four-wheel positive drive, four-wheel hydraulic steering—with a new, wider, tapered-end design that permits minimum turning clearance. Only 26" high, yet with level capacity of 2 tons. Centrally located operator's station gives equal visibility in either direction. Separate motors for traction, conveyor drive, and hydraulic pump drive. Exclusive JOY disc-type brakes on all four wheels—hydraulic cable reel and hydraulically-adjustable elevating discharge.

A HIGH CAPACITY Team for Very Low Vein Coal

We're proud to announce one of the greatest forward steps since the original JOY pioneering achievements in mechanical mining. *Now, for the first time*—with the advent of the JOY 12-RB Cutter, 20-BU-1 Loader and 8-SC Shuttle Car—high capacity production has become a reality for mines operating in very low coal. Here are some of the advantages. (1) The timing problems and labor of conveyor moves are eliminated in favor of the great flexibility and economy of shuttle-car mining. (2) The high mobility of JOY trackless equipment permits high-speed mining both on advance and retreat. (3) In case of a squeeze, only a few minutes are required to move all equipment from the section. ● *Call on us for any data you need.*

For thin or thick seams, whatever your operating conditions may be, JOY builds a complete, field-proved line of modern mining equipment to increase your tonnage and reduce your costs.

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and see what a big difference Triangle Flexible Pipe can mean to you in time and money:

1 IT IS LIGHT. Two 50-foot coils of Triangle Flexible Pipe are so light they can easily be carried by one man.
This means—easy, speedy handling. No abandonment. When finished at one facing, just carry the pipe over to the next one and re-use it.

2 IT IS FLEXIBLE. Finds its own floor. Snakes through crevices. Irregular terrain is no obstacle.
This means—no time wasted in costly bending operations, no involved 90° angle patterns.

3 IT RESISTS CORROSION. Triangle Flexible Pipe is guaranteed against rot, rust and corrosion.
This means—thousands of dollars saved here alone. Why let sulphurous water, alkalis, metallic salts eat away your investment when you can specify Triangle Flexible Plastic Pipe?

4 IT HAS A GREATER RATE OF FLOW. The smooth interior offers less resistance to flow. In addition, there is no clogging because nothing is deposited on the inner walls.
This means—a completely salvable pipe. Use Triangle Flexible Pipe over and over again! It won't clog.

Whether you want Flexible, Semi-Rigid or Rigid Plastic Pipe ask your distributor for Triangle.

Write for new booklet.

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New Brunswick, New Jersey

TRIANGLE — *Or Must Be Right*

Personal Notes

Henry W. Saunders retired Oct. 1 after more than 25 yr as chief engineer of the American Coal Co. of Allegany County and Mill Creek Coal & Coke Co., Bluefield, W. Va. **J. B. Farquharson,** formerly superintendent of Deerfield mine, American Coal Co., Covel, W. Va., succeeds Mr. Saunders, and James E. Brown Jr., succeeds Mr. Farquharson. A mining-engineering graduate of Toronto University, Mr. Saunders worked as draftsman and division engineer in mines in West Virginia before joining American Coal Co. in 1921 as chief engineer. In 1927, he was named chief engineer for Mill Creek Coal & Coke Co. also. Born in Scotland, Mr. Farquharson came to the United States at the age of 14 and worked in the West Virginia mines before his graduation from West Virginia University in 1919. He became an engineer for Mill Creek in 1926, and remained there until 1936, when he became superintendent of the Piedmont mine, American Coal Co., transferring to the Deerfield mine in 1947. Mr. Brown, a graduate of the Colorado School of Mines with a master's degree in engineering from the University of Washington, was with the Cardox Corp. before joining American Coal recently.

Bethlehem Foreman Honored

ALBERT MIHALSKY, retiring after 49 yr of service in the Acme and Marianna mines, was honored at a banquet held in September by the Marianna Officials' Club, Bethlehem Mines Corp., Marianna, Pa. Various mine, company, state and federal officials were among the speakers, and Thomas Jones, Marianna superintendent, presented Mr. Mihalsky with a gold watch from his fellow employees. Also present at the banquet was John H. Jones, 86, founder of the Marianna mines, who outlined their history from the founding. A motor boss at both mines for many years, Mr. Mihalsky has been succeeded by Paul Juracks.

Matthew Cecchett, assistant mine foreman, Ocean mine, Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., Library, Pa., has been named superintendent of that mine, succeeding **Richard McDougal** who has retired.

John Marshall, president, Pierce Management, Inc., Scranton, Pa., left in October to visit Austria, Greece, India, Burma, Thailand and Japan in connection with mining activities for the firm. He will return at the end of November.

Monte M. Soule, vice president and director of United Electric Coal Cos., Chicago, retired October 1. He had directed sales for the company for the past 27 yr.

Obituaries

John A. Kelly, 69, West Virginia coal operator and board chairman of the Guyan Eagle Coal Co., Huntington, W. Va., died Oct. 4 at his home, following a heart attack, shortly after returning from Washington where he participated in negotiations for the new wage contract. A graduate of the Eastman Business School, Poughkeepsie, N. Y., Mr. Kelly began his career in the coal industry at the age of 19 in West Virginia. In 1913, he helped organize the Main Island Creek Coal Co., at Omar, W. Va., and also bought an interest in the Prockter Coal Co. and Guyan Eagle Coal Co., of Amherstdale. He was instrumental in organizing the Buffalo-Chilton Coal Co., The Elk Creek Coal Co., and the Kelly-Hatfield Land Co., and was president of all these companies until December, 1951, when he was elected chairman of the board.

Arthur W. Dean, 77, president, West Virginia Pittsburgh Coal Co., died Sept. 29 at his home in Cleveland, Ohio. He also was associated with the Enos Coal Mining Co., and had been active in the coal industry for 60 yr.

K. S. McKinney, 53, treasurer, Utilities Elkhorn Coal Co., Pikeville, Ky., died Sept. 24 at his home. He had resided in Pikeville for the past 34 yr.

Robert H. Mayhew, 50, assistant mine foreman, U. S. Steel Co.'s No. 10 mine, Gary, W. Va., died Oct. 8 following a heart attack at his home. A native of Gretna, Va., he had been employed at Gary since 1934.

Gilbert E. Gildroy, 58, president of the Montana Coal Operators' Association and president of the Bair-Collins Co., Roundup, Mont., died Sept. 13. Connected with the coal industry most of his business life, he began his career with the Carney Coal Co., Sheridan, Wyo., of which his father was president.

Andrew J. Jenkins, 72, superintendent,

ROCK RATED!

FOR ROCK BOTTOM COSTS

P&H *MAGNETORQUE**

puts an end to the old swing frictions

We'll make this promise: You'll never have to "baby" this machine, even in the heaviest going! It's *built* for it — all-welded of alloy steels throughout, the toughest construction known. *It means steady digging.*

But the big pay-off in extra production comes with Magnetorque electric swing — enough faster to deliver 5 cycles to 4 on other machines in the 2½ yd. class. And the "time-outs" for adjustment and replacement of swing friction linings can now be salvaged for increased yardage. Magnetorque lasts the life of the machine.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

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Ask today for facts about the 955-A. Also the Model 1055 — its companion machine with 3½ yd. capacity.

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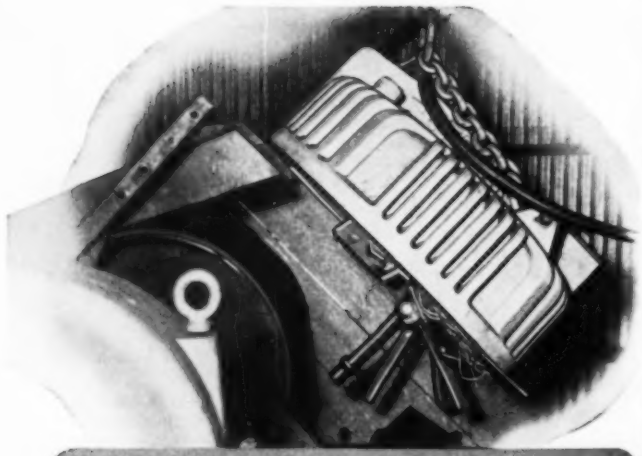

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Before DAMAGE Starts!

Here is the positive, economical way to protect crushers, grinders, pulverizers and other vital equipment — use a STEARNS Suspended Magnet over your conveyor or head pulley.

CIRCULAR SUSPENDED MAGNETS

Stearns Suspended Separation Magnets are powerful units for removing tramp iron from various kinds of conveyed materials where protection to crushers and other processing machinery is necessary. Eliminating foreign metal means fewer repair bills on crushing equipment, fewer shutdowns and higher production.

RECTANGULAR SUSPENDED MAGNETS

Stearns Suspended Separation Magnets are available in both circular and rectangular construction in all sizes to meet your needs. Easy to install and having low operating and maintenance costs, STEARNS Suspended Magnets are your best insurance against the tramp iron nuisance.

Whether your problem is the fairly simple job of tramp iron removal or the concentration and beneficiation of complex ores, STEARNS has EXPERIENCE ENGINEERED equipment to meet your requirements. Tell us about your problem; complete recommendations without obligation.

Foremost in the Magnetic Field

Stearns MAGNETIC INC.

661 South 28th Street, Milwaukee 46, Wisconsin

Gay Coal & Coke Co., Mt. Gay, W. Va., died Oct. 16 at his home, following a heart attack. Mr. Jenkins had been associated with the coal industry for the past 55 yr, joining Gay Coal & Coke as mine foreman in 1922.

Thomas F. Good, 57, safety director, Coal Div., Jones & Laughlin Steel Corp., Pittsburgh, Pa., died Oct. 14 at Brownsville Hospital.

William Mittendorf, consulting engineer for the Holmes-Darst Coal Co., died Oct. 9 at his home in Cincinnati. He is said to have been the first man in this country to carry the title of "Combustion Engineer," starting work with the Cincinnati Traction Co. with that title and later becoming chief engineer. Mr. Mittendorf began his study of combustion problems in 1905.

Thomas W. Page, 45, mining engineer, Armco Steel Corp., Middletown, Ohio, died Sept. 6. A geological engineer, he was graduated from the Montana School of Mines. Prior to joining Armco in 1943 to assist in the development of coal and other properties, Mr. Page served for over 2 yr with the War Production Board, and was superintendent of North Whitney Mines, Ltd., and Hidden Lake Ventures, Inc.

Charles L. Milligan, 71, inspector-at-large of the Kanawha division, W. Va. State Department of Mines, died Oct. 9 at his home in Charleston, W. Va., following a heart attack. He had been with the department since 1933, and was a coal operator prior to that time, operating in Boone and Logan counties. He was executive vice president of the Kanawha Valley Mining Institute.

Association Activities

Williamson Field Group Elects Tully President

The Operators' Association of Williamson Field named John M. Tully, president, Crystal Block Coal & Coke Co., Huntington, W. Va., president of the association succeeding Paul D. Ritter, president, Red Jack Coal Corp. Other officers elected at the meeting Oct. 16 included Harry S. Gay, vice president; J. D. McLaughlin, treasurer; and Joseph J. Ardigo, renamed secretary. C. W. French was appointed to the board.

Coal Operators' Association Formed in Western Canada

Nineteen companies, producing 6,500,000 tons annually, or 80% of the output of coal in Alberta and British Columbia, have formed the Coal Operators' Association of Western Canada, headed by W. A. Wilson, of Canmore, Alberta. Aimed at promoting the interests of the coal industry in western Canada and representing its members in dealing with government and trade unions, the organization comprises the membership of the Western Canada Bituminous Coal Operators' Association and the Domestic Coal Operators' Association of Western Can-

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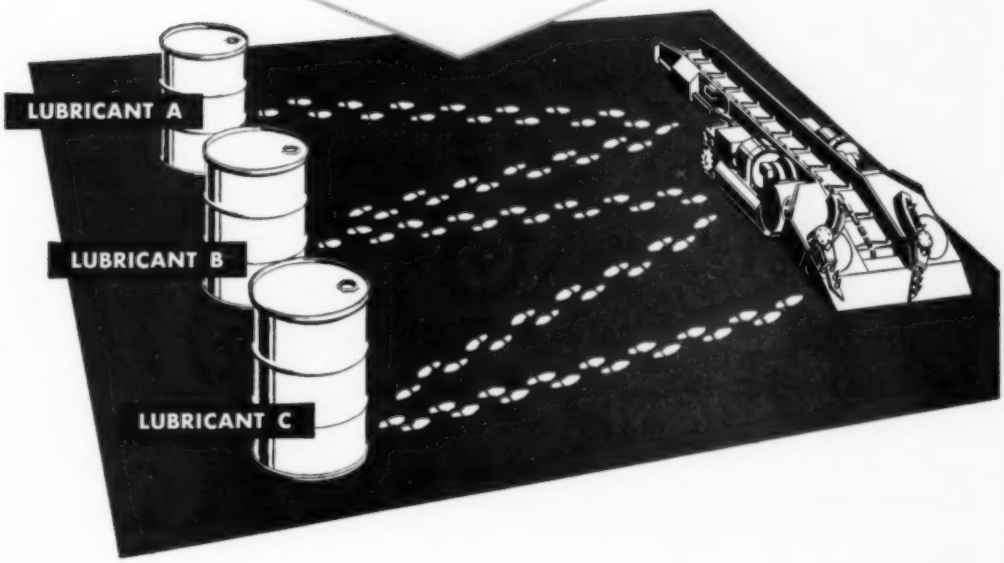

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Sizes—¾" through 60"

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You'll find you save time, work, and dollars with Victaulic — "*the easiest way to make ends meet.*" FOR YOUR OWN PROTECTION . . . make sure you get VICTAULIC!

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ada, which have been disbanded to make way for it. It also replaces the Western Coal Federation, of which the old associations were members. Other officers elected were L. Patrick, vice president; W. C. Whittaker, managing director, S. W. Foss, secretary; and A. D. Sturrock, William Bird, J. M. Davidson, W. L. Hammett, directors.

Morris Elected President Of Illinois Strip Groups

At the annual meetings of the Northern Illinois Coal Trade Association and Middle States Fuels, Inc., held jointly in Chicago, Oct. 15, John M. Morris, United Electric Coal Cos., was elected president of the Northern Illinois group, succeeding Monte M. Soule, recently retired. Other officers elected were: vice president, William H. Cooke, president, Little Sister Coal Corp.; and finance officer, T. C. Mullins, president, Midland Electric Coal Corp. Mr. Morris was also elected president of the Middle States Fuels, Inc., and A. J. Christiansen was re-elected secretary of both organizations.

Pennsylvania Operator Groups Elect Moore President

The Central Pennsylvania Coal Producers' Association and the Eastern Bituminous Coal Association held a joint annual meeting at Bedford Springs, Pa., Oct. 2-3, with approximately 250 members and guests attending. At the business session, Ralph H. Moore, president of C. A. Hughes & Co., was elected president of both organizations, succeeding F. A. Fontyn, president of the Ebensburg Coal Co. J. William Wetter was named vice president of the Central Pennsylvania association, and Mr. Fontyn vice president of the Eastern Bituminous group. The following were elected officers of both associations: R. T. Laing, executive director and secretary; Walter A. Jones, treasurer; and C. P. O'Neill, assistant treasurer. Elected directors of the Central Pennsylvania group were: M. J. Ackerman, T. L. Aitken, L. C. Campbell, George A. Clark, H. J. Connolly, E. M. Cortright, John N. Crichton, M. Albert Evans, R. M. Hess, Dennis J. Keenan, John M. Kerr, John W. Krous, Archibald Miller, Ralph H. Moore, T. F. McCarthy, A. J. Palumbo, Richard Peale, W. H. Ritter, C. M. Schwerin Jr., Charles M. Shoffner, Richard T. Todhunter Sr., J. William Wetter, Harold B. Wickey and Walter S. Williams. The directors elected for Eastern Bituminous were: Charles G. Berwind, Heath S. Clark, Nathan D. Cortright, Harry A. Crichton, F. A. Fontyn, Sam Light, J. W. McGinn, Ralph H. Moore, John B. Mull, Charles A. Owen, Rembrandt Peale Jr., W. H. Ritter, Charles M. Shoffner, L. D. Silberstein, Peter H. Tuttle, R. S. Walker, C. M. Watt, J. William Wetter and R. W. Wigton.

FIVE MEN are being paid $10 or more for their good "Operating Ideas" printed in this issue. Why not send us yours? Write: The Editor, COAL AGE, 330 W. 42 St., New York 36, N. Y.

Look for the distinguishing darkened rollers.
Thousands of tiny steel balls hammer the metal—"cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact.

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. . . one of the extra-wear features you get with every LINK-BELT Roller Chain

POWER-TRANSMISSION engineers and metallurgists agree—shot-peened rollers mean longer roller chain life. That's just one of the engineering extras you get with Link-Belt Precision Steel Roller Chain. Another is Link-Belt's exclusive lock-type bushing.

Remember, too, Link-Belt's rigid material selection and controlled heat treating assure chain uniformity . . . no weak members.

Link-Belt builds a complete line of roller chain—single or multiple widths in ⅜″ through 3″ pitch; and double pitch, 1″ through 3″. Submit your chain problems to the Link-Belt office near you.

No partial bearing here —bushing fits securely

Lock-type bushings increase ability to withstand severe operating conditions

A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1″ pitch and double pitch roller chains through 2″ pitch.

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LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, Factory Branch Stores and Distributors in Principal Cities. 12.89

COAL MEN ON THE JOB . . .

Utilities Elkhorn Coal Co., Pikeville, Ky.

LEFT TO RIGHT: J. E. Bowman, president, and R. H. Hedland, general manager; A. O. Coleman, general superintendent, High Point Elkhorn Coal Co.; J. H. Mosgrove, safety director, Big Sandy-Elkhorn Coal Operators' Association; O. J. Williams, electrical engineer, Walter Blankenship, engineer, and J. E. Green, general superintendent, Utilities Elkhorn.

This 8-wheel DIFFERENTIAL MINE LOCOMOTIVE is no ordinary piece of motive power. It has AXLESS trucks! Therein lies the difference between a royal ride and a regular ride.

We can't do it justice here but, in substance, this feature means greater speed with no sacrifice of safety. Means greater adhesive capacity per pound of weight. It also means better roadability and less wear and tear on both wheels and rails. Users appreciate the simplified design which means easier servicing.

It all adds up to more tons of coal transported per dollar invested in haulage equipment and per dollar spent for maintenance. Think this over! Send for Bulletin D-52 for complete specifications.

Differential Products Include: Locomotives, mine cars, mine supply cars, rock larries, mantrip cars, air dump cars, dumping devices and complete haulage systems.

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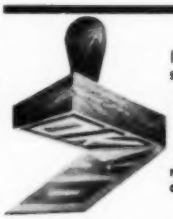
SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT



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INDUSTRY REPORTS

Main hoist gear and point sheave wheel on dragline, at Northern Illinois Coal Corp. mine, Wilmington, Illinois.

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144 months continuous service and still in operation.	30 months maximum service.
TSP SHEAVE (installed 1940)	**COMPETITIVE SHEAVE**
144 months continuous service and still in operation.	6 months maximum service.

NORTHERN ILLINOIS COAL CORPORATION

SUBSIDIARY OF SINCLAIR COAL COMPANY

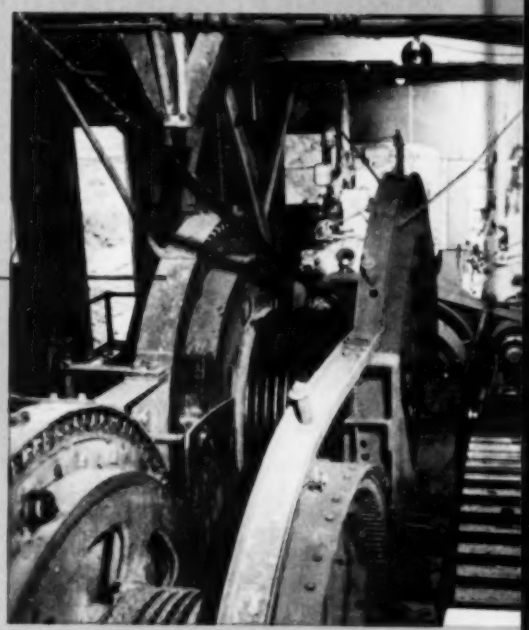
REPORTS TSP* PARTS OUTLAST THEM ALL!

In this customer's own service record comparison, "Tool Steel Process" Gear has already outlasted competitive gear by 5 to 1 and "Tool Steel Process" Sheave has already outlasted competitive sheave by 24 to 1 in the same service . . . and remember . . . they are still in service.

Next time you need replacement parts—specify "Tool Steel Process" parts. You'll have less-replacement expenses, savings in maintenance, reduction in costly "down-time" and the tremendous economies in long range uninterrupted operation. Write for descriptive bulletins.

TSP MAIN HOIST GEAR which has already given 12 years service in this punishing dragline operation . . . and still going strong.

TSP SHEAVE is in its 12th year of service. Ordinary sheaves lasted only 6 months.



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CINCINNATI 16, OHIO • U.S.A.

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. . . says **CHARLES BEIL**
of Chas. Beil & Sons, Millstadt, Illinois

"I've tried a lot of trucks but Dodge is my all-time choice. We've never had any trouble with Dodge *'Job-Rated'* trucks in our 365-day-a-year schedule of hauling up to 2,000 tons of coal a day. This haul is direct from the coal pit to the user.

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"Dodge greater lasting power means money to us. An out-of-service truck in this business is an expensive proposition."

Mr. Beil's many years of firsthand experience have *proved* to him that Dodge *"Job-Rated"* trucks *fit the job* . . . last longer . . . haul maximum payloads . . . save him money.

He knows that because Dodge *"Job-Rated"* trucks provide the right engine—the right horsepower—for his hauling needs, he can count on years of dependable, trouble-free service. And because of better weight distribution, high rear axle capacity and other important load-moving advantages, Dodge *"Job-Rated"* trucks handle his rugged hauling jobs easily and more profitably.

There are Dodge *"Job-Rated"* trucks engineered to fit *your* specific hauling needs, too. Why not visit your nearby Dodge dealer soon? You'll find him friendly, cordial and full of facts that can save *you* money in your hauling problems.

DODGE "Job-Rated" TRUCKS

WHEN DIGGING'S TOUGH, THIS DIPPER'S TOUGHER

How service and manganese steel are cast and welded into **AMSCO** Dippers

More than 5,000,000 cubic yards of rock and abrasive materials have been dredged by one AMSCO All-Manganese Steel Dipper similar to this 1¾-yard model —and the end of its service is nowhere in sight!

Service like this is expected—and considered normal—by users of AMSCO Dippers. Just as users throughout all industry know that AMSCO Manganese Steel Products mean service and long life wherever impact and abrasion must be controlled. AMSCO Manganese Steel has the unique quality of actually becoming harder with use, acquiring a high surface polish to shrug off grinding abrasion, while retaining body metal toughness.

Made *entirely* of "The Toughest Steel Known," AMSCO Manganese Steel Dippers use no rivets, but are fabricated by the modern, streamlining Plug-Welding method that permanently interlocks cast segments. AMSCO All-Manganese Steel Dippers are available in two-piece welded, three-piece renewable lip, and Missabi designs—or can be adapted to your unusual materials handling specifications. Also available in sizes to fit all power shovels.

Check these additional PLUS features:

- **One-piece Manganese Steel back casting.**
- **Top and bottom have cast-in, double-wall box-sections for maximum strength, minimum weight.**
- **Cast-in pin connecting lugs for handle, back, braces, bail.**
- **Bail is a one-piece casting with elongated tubular cross-section, for strength and lightness.**
- **Teeth are set for clean, fast digging.**
- **Interior is smooth and slightly tapered for free dumping.**

Contact your shovel manufacturer about AMSCO Dippers, or write AMSCO, Chicago Heights, Illinois.

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BEE-ZEE ROUND ROD SCREENS MAKE IT EASY

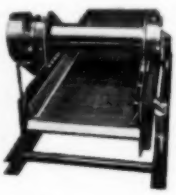
Water just can't stand around on BEE-ZEE screens. That's because exclusive round rod design (with some help from the law of gravity) keeps the water rolling downward where it belongs . . . keeps it out of your coal cars where it can cause exasperating, expensive winter freeze-ups.

HERE'S ANOTHER MONEY-SAVING ROUND ROD FEATURE:

Round rods maintain accuracy even when worn halfway through . . . adding extra months of performance . . . providing a greater time span between shut-downs for installation.

ADAPTABLE TO ANY SCREENING JOB

BEE-ZEE screens can be designed and built to solve your particular screening job. We welcome the opportunity to make recommendations on your screening problem. Send us your requirements. No obligation.



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Engineering Co.

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BEE-ZEE SCREENS CAN BE FITTED TO ANY COAL PROCESSING EQUIPMENT

COMING MEETINGS

National Coal Association: annual convention, Nov. 10-12, Waldorf-Astoria Hotel, New York.

Coal Exporters' Association of the United States, Inc.: annual meeting and luncheon, Nov. 10, Waldorf-Astoria Hotel, New York.

Kentucky Mining Institute: annual meeting, Nov. 13-14, Phoenix Hotel, Lexington, Ky. (Information from A. D. Sisk, secretary-treasurer, Box 680, Lexington, Ky.)

Violence Again Reported In Some Coal Fields

A gun battle at a non-union operation near Grundy, Va., which continued to work during the current stoppage, was reported by police Oct. 20. A cabin housing seven workers at the Whaley Coal Co., near Oakwood, was fired on twice at night but no identifications were made and there was no evidence to tie the firing up with the UMWA, county officials said. The mining company had earlier secured an injunction limiting picketing to five men at a time. A number of small non-union mines in Buchanan County, long a scene of organizing strife, were reported to have continued working during the stoppage.

Earlier, on Oct. 14, 10 men were charged in a magistrate's court with conspiracy to do bodily harm by violence in connection with a strike at the Widen mine of the Elk River Coal & Lumber Co., Widen, W. Va. Four of the men and eight others also were directed to show cause in the circuit court why they should not be cited in contempt of an injunction prohibiting violence and interference with employees wishing to work. Involved in the stoppage, then going into its third week, was the Widen League of Independent Miners.

In Kentucky, the Garneada Coal Co., Middlesboro, filed its second damage suit against the UMWA in the Lexington federal court. In asking $75,000 damages, the company said that it had signed a wage contract on Sept. 30, but that members of the union had refused to return to work until its first suit against the union, filed last May and still pending in a federal court, was withdrawn. The first suit was filed to recover damages suffered during organizing last spring, the company said, and it refused to withdraw the action as part of the price of getting a wage agreement.

PMW Signs Wage Agreement

The Progressive Mine Workers announced Oct. 2 the signing by the Coal Producers' Association of Illinois of new wage agreement paralleling that won by the UMWA. The new PMW contract calls for $1.90 a day wage increase and a boost of 10c a ton in the royalty paid to its welfare fund, subject to WSB approval. The group also reported Oct. 8 that three candidates were seeking the presidency of the union in elections to be held Dec. 1.

You get that extra margin of endurance with Thermoid

CONVEYOR BELTS • HOSE • MULTI V-BELTS

Whatever your business, you have applications that involve Conveyor Belts, Hose or V-Belts where these Thermoid products will do your job better—provide that extra margin of endurance that cuts costs.

Constant improvement and expansion of engineering and production facilities have always been part of Thermoid's program for the past 70 years. The results of this continuous program are rubber products that guarantee you high operating efficiency and superior performance . . . meet the demand for maximum service at minimum cost . . . last longer and require less maintenance.

When you have a design, production or operating application involving Conveyor Belts, Hose or Multi V-Belts, call your Thermoid distributor. In most cases, he can select the size and type that will serve your needs most efficiently. Thermoid Sales Engineers are always ready to help you with special problems.

It will pay you to specify Thermoid.

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COAL CUTTER CHAIN and BITS

ONE-PIECE BIT HOLDER

BOWDIL BITS

BIT-CARRYING BODY SECURELY WELDED TO CHAIN

HEAVY SHOULDERS ON LINKS CARRY LOAD

SET SCREW LOCKS BIT HOLDER

LARGE HEAT-TREATED PINS

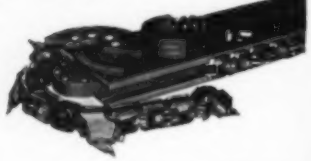
HEAVY-WALL HARDENED BUSHING

RADIAL TRACK GUIDES

DROP-FORGED LINK AND CONNECTOR

INGENIOUS RIVET LOCK

Made by the makers of the



STRONGEST CUTTER-BAR IN THE COAL INDUSTRY

BOWDIL BITS

for lowest coal per ton

THE BOWDIL COMPANY

CANTON, OHIO

A gravel pit owner reports . . .

J & L JALLOY "HAD 'EM SKUN A MILE"

At Left—Walter Stevens holds up J&L Jalloy cutting edge which lasted 2½ years before replacement. Only ⅛" thinner than when new.

Above—It takes tough steel to withstand digging material like this!

Above—Walter Stevens rams loader bucket into gravel bank to pick up another load of gravel.

MAINE STEEL INC. uses tough J&L JALLOY to decrease "Downtime" on Hydraulic Loader at H. H. Stevens Co.

We're pretty pleased with the way Mr. Walter Stevens of H. H. Stevens Sand & Gravel, Gorham, Me., feels about J&L Jalloy.

Mr. Stevens is using a "Straight-Line" hydraulic loader, built by Maine Steel Inc., to load trucks with the sand and gravel from his pit. It's tough work. The loader bucket is rammed into the gravel bank at high speed reverse, which means the severest kind of impact and abrasion on the equipment.

To decrease service interruptions to the work of its loaders, Maine Steel has used ¼" x 6" Jalloy plate for the bucket's cutting edge.

Here's how Jalloy has worked out—

Mr. Stevens reports, the first cutting edge of Jalloy lasted 2½ years—loaded 40,000 cubic yards of sand and gravel.

Mr. Stevens sums it up this way. "*That blade saved me quite a bit of money.*"

And Maine Steel Inc. is pleased with J&L Jalloy too—

P. J. MacDonald, Maine Steel Welding Foreman, reports Jalloy is no trouble at all to weld using a regular coated rod.

Finally, Mr. G. C. Soule, President of Maine Steel, says that HE'LL CONTINUE TO SPECIFY J&L JALLOY FOR ALL CUTTING EDGES.

Why not write today for our booklet, "*For Longer Wear . . . Less Repair.*" It will give you complete information on Jalloy, plus examples of how other mining and quarrying men are using this modern mining steel to save them money. The coupon is for your convenience.

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Please send me a free copy of your booklet, "For Longer Wear . . . Less Repair."

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JONES & LAUGHLIN STEEL CORPORATION PITTSBURGH 30, PA.

ENGINEERED ESPECIALLY FOR ROOF BOLTING

ELRECO EXPANSION UNITS ARE BETTER, SAFER!

Because they have been engineered especially for your roof bolting operations our new Elreco expansion bolts and shells are your best buy for speedy installation, sure safety.

Made of high-grade malleable iron, the unit allows expansion from the 1¼-inch insertion diameter to a maximum of 1 11/16 inches. The plug is designed to engage either the sides or top of the hole. The expander shell has a ridged contour for easy insertion and secure holding.

Result? Elreco roof bolts can be installed quickly, easily. You can count on them to hold securely, safely for long periods of time. And they may be recovered and re-used in many cases.

Available in both ⅝" and ¾" sizes, Elreco's roof bolting fittings consist of Expander Plugs, Expansion Shells, Rods in any length, Palnuts and Take-up Nuts as well as Adapters for quick installation of air, water or feeder lines and Universal Angle Washers for roof bolts inserted at any angle up to 45°.

Our company also manufactures the exclusive Inverted Trolley, Overhead Trolley Material, Junction Boxes, Trolley Taps and miscellaneous safety devices.

Write today for your free copy of our new illustrated bulletin on roof bolting. Address your inquiry to me personally, c/o Elreco, 2510 Cormany Ave., Cincinnati 25, Ohio. You'll be glad that you did.

THE ELRECO CORPORATION

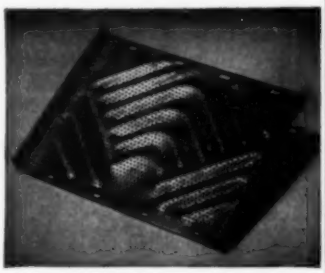
Serving the mining industry since 1892

New Mine Developments

Weston Dodson Acquires Lansford Colliery Output

Acquisition of the output of the Lansford colliery of the Lehigh Navigation Coal Co. by Weston Dodson & Co., Bethlehem, Pa., was announced last month by C. M. Dodson, company president. The property will be known as the Dodson colliery, shipping from Dodson, Pa. Citing the addition as the "third and most important step in our long-range program for expanding our facilities so as to assure our clientele of an unlimited supply of highest quality coal for at least the next quarter century," Mr. Dodson also said: "The first step in our over-all plan for expansion was announced in March, 1950, when we opened our Silver Brook property at Tamaqua. In May, 1952, we announced the second phase of our plan in the opening of the Morea Basin property at Mahanoy City.

"Both these coal properties have been developed and are now actively supplying coal according to schedule," Mr. Dodson continued, "but they were only the preliminary steps towards our goal of a tonnage potential that far surpasses the possibilities of the present Dodson properties. This anthracite property in the Tamaqua area is complete with fully developed mines and tremendous reserves of virgin coal, a large modern breaker with efficient preparation facilities, and excellent railroad origin for reaching all markets. In the process, surplus production from our Silver Brook and Morea operations will be absorbed and blended into this new Dodson product."



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A "must" when it comes to obtaining an efficient job! *Good* because the spreading and collecting riffles give uniform spread of material over the entire screen surface . . turns the top and middle flow of material down in direct contact with the screen . . . gives an increased screening efficiency up to 33% on fine sizes over an undented flat screen.

Comes in Carbon and Stainless Steels and Manganese Bronze. No sag.

Write us today. We shall reply promptly.

REMALY MANUFACTURING CO., INC.
TAMAQUA, PA.

Virginia Operator Purchases 24,000 Acres in Tennessee

Purchase of 24,000 acres of coal on Walden Ridge, in Hamilton County, Tennessee, was announced early last month by George C. Wharton, president, Wharton Coal Co., Wise, Va. Mr. Wharton is currently prospecting the property, with the expectation of offering it for lease to one or two large coal-producing companies. The area contains at least four workable seams, Mr. Wharton reported, the two best known being the Sewance and the Nelson, which are both excellent steam or by-product coals, though somewhat higher in ash in Tennessee than the correlating seams in Virginia and West Virginia, he said. The property offers definite possibilities for supplying TVA plants as freight rates are favorable, Mr. Wharton pointed out.

Midwest Utilities Slope To Begin Output Soon

First coal from the new Sparta (Ill.) mine of the Midwest Utilities Coal Corp. is expected to be available in February, H. W. Bradbury, company president, reported last month. Work was scheduled to begin very shortly on the 4-track coal preparation plant designed to prepare 13 sizes, Mr. Bradbury stated. The two slope openings, one for a 42-in belt and the other for materials handling, have been sunk to the coal and now are being completed. The company, which is affiliated with the Simpson Creek Collieries Co., plans an eventual capacity of 3,000 tpd and is reported to hold some 8,000 acres of coal rights containing an estimated 50 million tons.

Newly Organized Company Buys Three W. Va. Mines

The newly formed Wood Pocahontas Mining Co., Cincinnati, has purchased three mines and a coal-cleaning plant from the Leccony Smokeless Fuel Co., Besoco, W. Va., and plans extensive development of the property, it was reported last month. Organizer of the new firm is Frank E. Wood Jr., former president of the Carrs Fork Coal Co. and currently associated with the Clinchmore Mining Co., operating in Tennessee. Paul E. Ash, Beckley, W. Va., is vice president and general manager, and Harry E. Moran, Leccony Smokeless president, is treasurer and operating consultant. Some 2,700 acres of coal land leased from the Piney Coking Coal Land Co. is included in the arrangement, which was said to have involved about $1 million, and the property reportedly

When the going gets ROUGH

. . . you need a navigator who

Knows the Course!

Whether it be a relatively minor problem—or a crisis—when the going "gets rough" you need the best guidance, the best professional advice obtainable.

Allen & Garcia Company, a professional mine engineering service, has the experience to warrant confidence and trust in expert analysis of your problems . . . experience based on a reputation of sound, scientifically-correct recommendations.

Unencumbered by affiliation with *any* manufactured product, you are assured of unprejudiced approaches to all of your problems. A & G specially-trained engineers are qualified to accurately evaluate and efficiently remedy problems for small mines as well as the largest.

Preliminary consultation is yours without obligation.

SCOPE OF SERVICES

- Design and construction of new plants and their various units.
- Organization, operation and management of mines.
- Below ground modernization and mechanization.
- Reconstruction, revamping, or improvement of existing plants.
- General consulting work regarding power, equipment, operation, and various mining problems.
- Valuations for financing, fire loss, taxation purpose—reports and appraisals.

We work with undivided responsibility to you on a cost and fixed fee basis. We are not hampered by any connections which might prejudice the true professional engineering approach to your problem.

A&G CO.

Allen & Garcia Company

CONSULTING AND DESIGNING ENGINEERS

Safe! Dependable!

MINE TRANSPORTATION

LEE-NORSE TJI MINE JEEP

The TJI Mine Jeep provides safer, faster underground transportation for Mine Superintendents, Engineers, Inspectors, and Maintenance Personnel to and from working faces and emergency areas. Its many applications include pulling man-trip cars, fire-fighting equipment, and conversion to ambulance duty at a moment's notice.

The Lee-Norse TJI Mine Jeep is a much-needed vehicle in your underground transportation system! Write today for details.

Now! ½ the Size... ½ the Cost

LEE-NORSE SCOOTER

A NEW, SPEEDY MINE PERSONNEL CARRIER

Quick, independent transportation for Mine Mechanics, Pumpers, Fire Bosses, and other maintenance personnel at one-half the cost with the Lee-Norse Scooter! Approximately one-half the size of the Mine Jeep, the Lee-Norse Scooter is rugged and simple in design, incorporating many standard Mine Jeep parts. Weight—approximately 1000 lbs.; Wheel Base—48"; Overall Length—9'-0"; available in all track guages, 36" to 48". Headlights available at slight additional cost.

The Lee-Norse Scooter provides low-cost, run-about transportation when and where it is needed! Write today for complete information.

Lee-Norse Company

CHARLEROI, PA.

has underground reserves of some 12 million tons of by-product coal.

And For Your Information . . .

The Ritter Coal Co., DuQuoin, Ill., is planning to open sometime this winter a new mine near Sparta, Ill., designed for a capacity of 500 tpd.

Consolidated Fuel Co., Frostburg, Md., has opened a new Consolidated No. 10 deep and strip mine at Carlos Junction, Md. The operation will mine the Tyson seam and ship via the C&P RR. The company's previous No. 10 mine on the Eckhart Branch of the C&P has been closed.

Full mechanization of the Robb, Alberta, mine of the Bryan Mountain Coal Co., a wholly owned subsidiary of the New Pacific Coal & Oils, Ltd., was scheduled to be completed in October. Coal shipments in that month were expected to more than double the 12,000 tons shipped in September. The company has spent nearly $2 million on modernization of the mine, it was reported.

Crow's Nest Pass Coal Co., Ltd., is increasing its coke production by 170 tons daily with the completion of a new 16-oven battery at its Michel colliery, Michel, B. C. Under construction over the past year at a cost of over $1 million, the new ovens will use 240 tons of coal a day.

The Bellingham Coal Mines, Bellingham, Wash., reportedly re-opened during September after a shutdown of several months. New equipment installed during the period will permit more efficient and economical operation, it was reported.

The St. Ellen mine of the Perry Coal Co., O'Fallon, Ill., closed since Aug. 8 reportedly because of restricted market demand and falling realization, was preparing to re-open early last month. The company was said to have decided to resume operation following talks with officials of the PMWA, but terms of any agreement were not disclosed. The mine formerly employed 300 men and produced 3,800 tpd.

High Costs Close Some Mines

Permanent closing of the Pinnickinnick mine of the Consolidation Coal Co. (W. Va.), Div. of Pittsburgh Consolidation Coal Co., near Clarksburg, W. Va., was announced Oct. 7. One of the oldest mines in the country, with a producing record of 75 yr or more, the mine could not be operated profitably under the new wage agreement, according to George Higinbotham, president of the division. While the operation was working out and would have eventually been closed, the higher wage rates and added royalty payment were the deciding factors, he said. The company was unable at this time to absorb the 190 men employed there, it was understood.

Two dayes earlier, the Christopher Coal Co., another Pittsburgh Consol division, reported that it was closing its Pursglove No. 8 mine, at Pursglove, W. Va., as a result of higher operating

(Continued on p. 160)

WIRE ROPE, too, resists attack with the RIGHT KIND of muscle

Brawny chest and shoulder muscles make the gorilla a formidable foe in the eternal warfare of the jungle. Defending himself and his family, this 450-pound heavyweight stands erect and fights back with sledge-hammer blows of his mighty forearms.

In wire rope, too, it takes the right kind of muscle to resist constant attack of abrasion, corrosion, bending fatigue, load strain and shock stress.

Complete quality control of Wickwire Rope means that you can always count on the right grade of steel and size of wire; the right construction and lay of the rope for best results on your particular job.

See your Wickwire Rope distributor or contact our nearest sales office.

THE COLORADO FUEL AND IRON CORPORATION — Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION — Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

WICKWIRE ROPE
A CF&I PRODUCT

1221

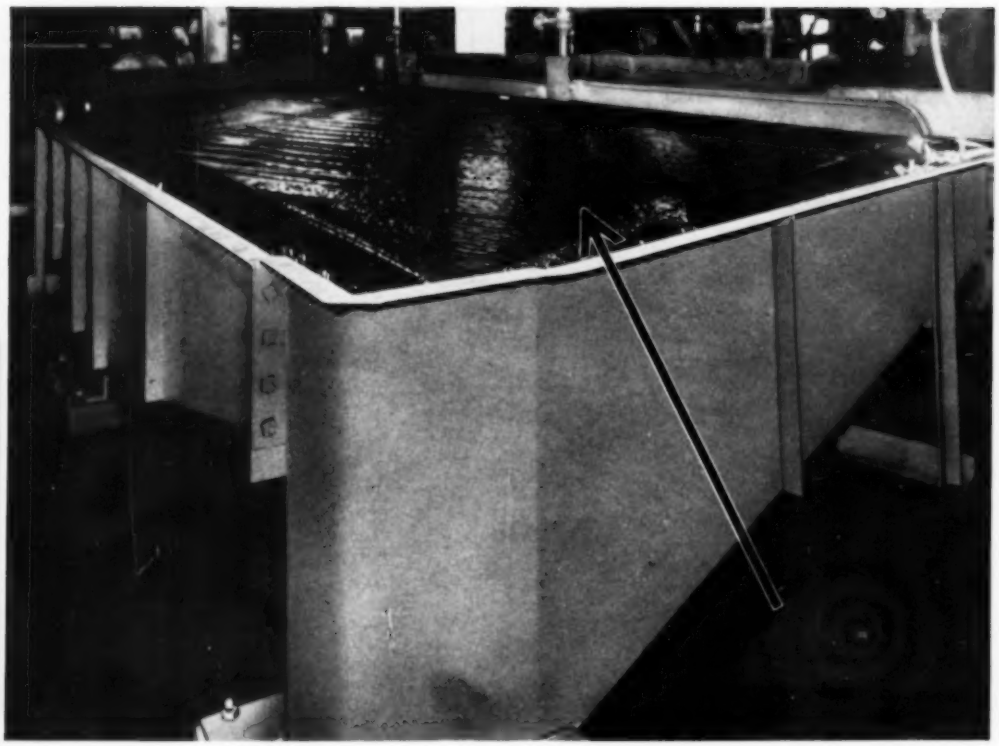
A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

How does U. S. Rubber help launder coal?



This washing table automatically separates coal from its natural impurities – slate, sulphur, fire clay, etc. It is equipped with a specially designed U.S. Rubber cover and specialized contour arrangements of "U.S." Rubber.

Abrasion was once the worst enemy of the surface covering on coal washing tables. Replacement was frequent and always slowed up production. The problem was turned over to "U.S." engineers, who developed a one-piece (or seamless) rubber covering that is abrasion-resistant and far outlasts the coverings previously used. Once again "U.S." pioneering has paid off.

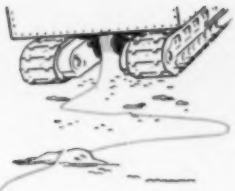
If you have any abrasion problem involving washing and concentrating tables, or materials handling, get in touch with United States Rubber Company. Write to address below.

PRODUCT OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.



proved in **our** mines

for better performance in **yours**

We—at Anaconda—are miners ourselves. We know shovel cable because we use lots of it. Safety and uninterrupted flow of power are important in any mining operation. In both respects we know Securityflex® Type SH-D has a good record.

for longer "failure-free" service on big shovels, insist on

Butyl-Insulated Securityflex above 2kv

This is Butyl-Insulated Securityflex Type SH-D. For your drills use patented rubber-cored Type G Securityflex Portable Cable.

ANACONDA Securityflex Cable is safer, less liable to "blow-out," easier to work with. Here's why:

BUTYL INSULATION. This accounts for improved resistance to moisture, ozone, heat (up to 80C).

NEOPRENE JACKET. Here is real flexibility and great strength engineered for this specific tough use. Handles well, has high impact resistance and lasts longer in all weather.

RUBBER-CORED GROUND WIRES. This safety-first feature prevents kinking, gives greater shield contact, and cushions the wires.

COPPER-COTTON SHIELD. Special new-type shield makes splicing easier, faster without damage to insulation. Eliminates chafing failures.

Ask your Anaconda Sales Office or Distributor to show you this and other ANACONDA portable mining cables. Learn how continuous improvements have made these famous cables better . . . for safety . . . and for increased production at less cost in your mine. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Trademark

the right cable for the job ANACONDA® wire and cable

COAL MEN ON THE JOB . . .

Panther Coal Co., Inc., Roseann, Va.

LEFT TO RIGHT: Fred D. Leckie, general superintendent, and W. W. Coleman, chief engineer, of the Leckie coal mining organization; R. F. Palmer, mine foreman, A. T. Thornton, tipple foreman, and B. B. Brown, chief electrician, Splashdam mine, Panther Coal Co., Inc., Roseann, Va., a Leckie property.

Up went the profit!...

when big Pennsylvania mine put in the

NOLAN PORTA-FEEDER

The photo at the right shows a 15 H.P. Nolan Porta-Feeder used for moving cars quickly and efficiently, saving time and money day after day, in a big Pennsylvania mine operated by a major steel company. Installations such as this have shown Nolan Porta-Feeder records of savings as high as 40 minutes per shift in spotting cars for loading, for a large number of coal operators.

The Porta-Feeder mounts between the rails on top of the track ties, secured by jacks that permit quick movability. Little or no excavation or preliminary foundation work is necessary.

Strong, massive construction. No ropes or cables. Quick movability of entire unit. Reciprocating pushing dogs deliver constant forward feeding motion.

3 MODELS

DIRECT MECHANICAL DRIVE
Shown in Above Illustration

HYDRAULIC FLUID MOTOR DRIVE
Hose Coupled to Remote Power Unit

HYDRAULIC CYLINDER TYPE
Hose Coupled to Remote Power Unit

WRITE FOR DETAILS

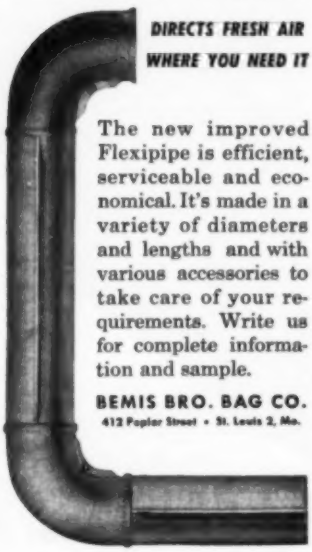
NOLAN

THE NOLAN COMPANY 106 PENNSYLVANIA ST. BOWERSTON, OHIO

USE

FLEXIPIPE

. . . the quality ventilating tubing



DIRECTS FRESH AIR WHERE YOU NEED IT

The new improved Flexipipe is efficient, serviceable and economical. It's made in a variety of diameters and lengths and with various accessories to take care of your requirements. Write us for complete information and sample.

BEMIS BRO. BAG CO.
412 Poplar Street • St. Louis 2, Mo.

Big lift for maintenance men...

● With its hundreds of belt idler bearings, this large coal conveyor at a midwest surface mine could have presented significant lubrication and maintenance problems. That's why mine officials, acting upon the suggestion of a Standard lubrication specialist, switched to STANOBAR Grease No. 2.

STANOBAR has dispensed easily from grease guns, thus providing a big lift for maintenance men. This has served to keep time and labor for applying lubricant at a minimum. There has been no trouble from hardening or caking of the grease in the bearings, nor has leakage been a problem. Effective lubrication has prevented any bearing failures due to excessive wear and has kept power requirements for starting and moving the conveyor belt at a minimum.

Operators of this mine have found STANOBAR entirely suited for bearing lubrication in other tipple equipment, such as shaker screens. This versatility has helped simplify lubrication from both stocking and application standpoints.

STANOBAR
TRADE MARK
Grease

The experience of this mine points to savings you can make through Standard's lubrication engineering service and high quality products. How you can get this lubrication service, quickly and easily, is explained at the right. Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?

H. Dillingham, of Standard Oil's Evansville, Indiana, office, is the Standard lubrication specialist who worked with this mine to find the right grease for a tough job. As a result of his work, the mine was able to save time and expense for the maintenance of a coal conveyor.

His on-the-job service is typical of that available to all midwest mines through a corps of such lubrication specialists. You can be sure that the specialist in your own area has both the practical experience and the training in a Standard Oil Lubrication Engineering School that will result in dependable, thorough assistance. To reach him, all you need do is phone your local Standard Oil Company Office. When he calls, be sure to discuss with him the benefits offered you by such products as:

STANOIL Industrial Oils—Simplify your lubrication jobs by using this *one* line of oils that provides cleaner operation of loader and crane hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems.

SUPERLA Mine Lubricants—These new, improved oils and greases provide better lubrication of cutters, loaders, locomotives, mine cars, and other underground equipment. They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

CALUMET Viscous Lubricants—On open gears and wire rope, these greases resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

STANDARD OIL COMPANY **STANDARD** (*Indiana*)

STANDARD IN CONSTRUCTION MACHINERY

Leading excavator manufacturers offer Twin Disc Drives as standard equipment . . . because the digging, business puts shovels, draglines, loaders to the severest tests met by any industrial machinery.

So, where the going is toughest . . . wherever work output depends on husky drives . . . you find the brawn of engine and machine linked by Twin Disc friction and hydraulic drives for top performance.

Like the manufacturers, the users of construction machinery, too, have settled on Twin Disc as the *sure source* of drives because they are dependable, long lasting, easy to service. And furthermore, because they are backed by the most complete service—Twin Disc maintains a $3¼ million stock of parts and replacement units at 8 Factory Branches and 60 parts stations strategically located for fast service.

Twin Disc Drives are offered as standard on Lima Shovels. A Twin Disc Power Take-Off is the main engine Clutch, and two Model 8 Clutches (one shown) control the swing on the Lima Type 34 Paymaster Shovel.

Built for a Long Life . . .
Backed for a Lifetime

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

costs and current market conditions. The mine employed about 230 men and produced 362,907 tons in 1951. Working-out and closing of the Raysal mine of the Pond Creek Pocahontas Co., Welch, W. Va., was reported Oct. 16. Opened in 1932, the mine was named for Raymond Salvati, now president of Island Creek Coal Co. and Pond Creek Pocahontas, who was superintendent at the time.

In Tennessee, the Blue Diamond Coal Co. closed its Royal Blue mine, in Campbell County. The company had closed its Westbourne operation, also in Campbell County, several months previously. In the 1946 investigation of health and medical conditions in mining communities, the Federal inspection team called Royal Blue one of the most-up-to-date mining towns in the U. S. The permament closing of the Washington (Pa.) mine of the Hillman Coal & Coke Co., also was reported last month.

In Canada, closing of the coal mining operations of the Intercolonial Coal Co., at Westville, Nova Scotia, was authorized at a special meeting of shareholders. The dieselization of Canadian railways and high producing costs were cited as the major causes.

Preparation Facilities

Mathies Coal Co., Mathies mine, Courtney, Pa.—Shipment by Deister Concentrator Co. of 14 SuperDuty Diagonal-Deck No. 7 coal-washing tables for cleaning ¼ x 0 fraction.

Bell & Zoller Coal & Mining Co., Buckhorn mine, Herrin, Ill.—Shipment by Deister Concentrator Co. of one Model 109 Concenco revolving feed distributor for 3-way distribution.

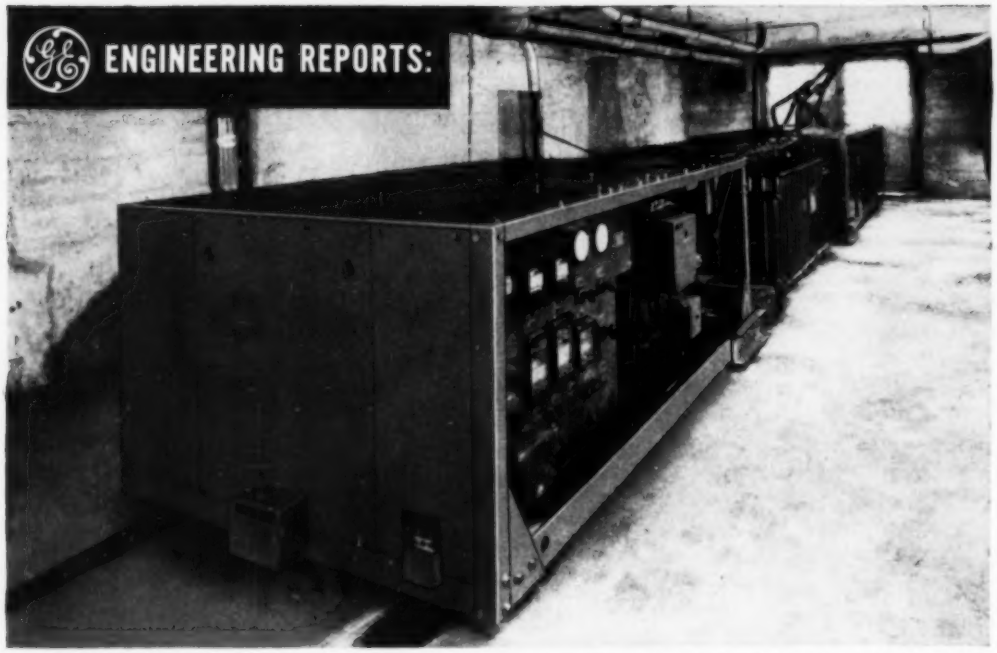
Dawson Daylight Collieries, Dawson Springs, Ky.—Shipment by Deister Concentrator Co. of one Model 109 Concenco revolving feed distributor for 4-way distribution.

U. S. Steel Co., Robena mine, Greensboro, Pa.—Shipment by Deister Concentrator Co. of two 8-cell Concenco Super-Sorters.

New Holmes Safety Council In Beckley Names Officers

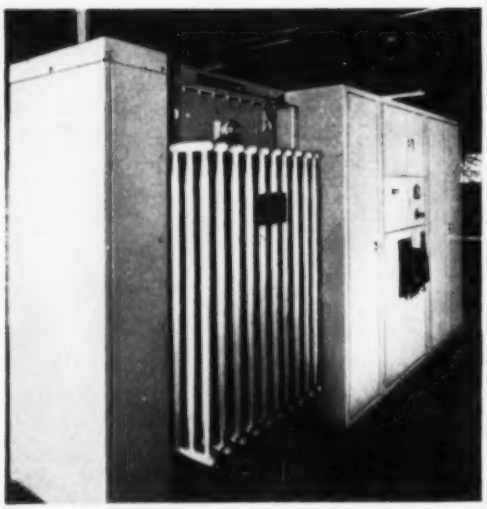
At a charter meeting of the recently organized Joseph A. Holmes Safety Association Council at Beckley, W. Va., the following officers were named: William Rachunis, federal coal mine inspector, president; Joshua Smith, safety director, Coal Div., Eastern Gas & Fuel Associates, first vice president; W. A. Haslam, assistant to the vice president of operations, The New River Co., second vice president; L. T. Putman, vice president, Raleigh-Wyoming Mining Co., third vice president; C. E. Jones, safety engineer, District 29, UMWA, treasurer; and John Manley, chief clerk, Coal Div., EG&FA, secretary. The new council is made up of eight chapters, with a memership of more than 4,000 West Virginia miners employed in 13 coal mines operated by four companies in and near Beckley.

Wilmot lists the MOST
CHAIN ATTACHMENTS
In the catalog of Wilmot Rivetless chain conveyors and elevators you will find by far the largest listing of attachments available — in malleable iron, drop-forged steel and cast carbon or alloy steels. As the originators of Rivetless chain, Wilmot also offers the largest choice of chain sizes, and conveyor and elevator parts from drive to take-up. Chain in pitches from 3" to 10½" and working loads from 3,000 to 130,000 lbs., of drop-forged steel, alloy or cast chrome-manganese. Because of our larger choice of conveyor parts, an increasing number of firms depend on Wilmot for replacements.
Send for NEW 248-PAGE BOOK on Chain and Conveyors
Chains
WILMOT ENGINEERING CO.
HAZLETON, PA.
Plant:
WHITE HAVEN, PA.

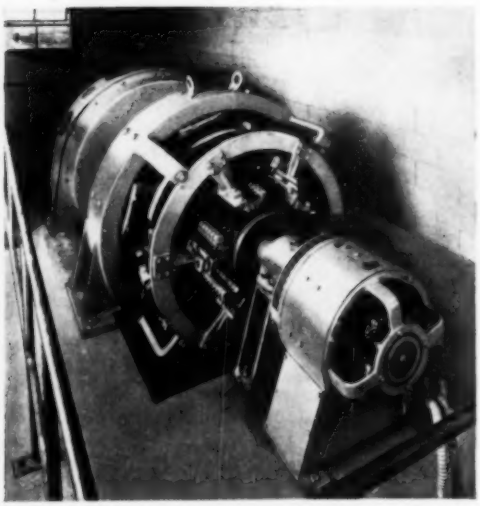


FULL VOLTAGE AT THE FACE is maintained at Crown Mine by this 300-kw G-E portable mining-type rectifier, to keep equipment working at high efficiency. The fully integrated, automatic unit is enclosed to better protect personnel.

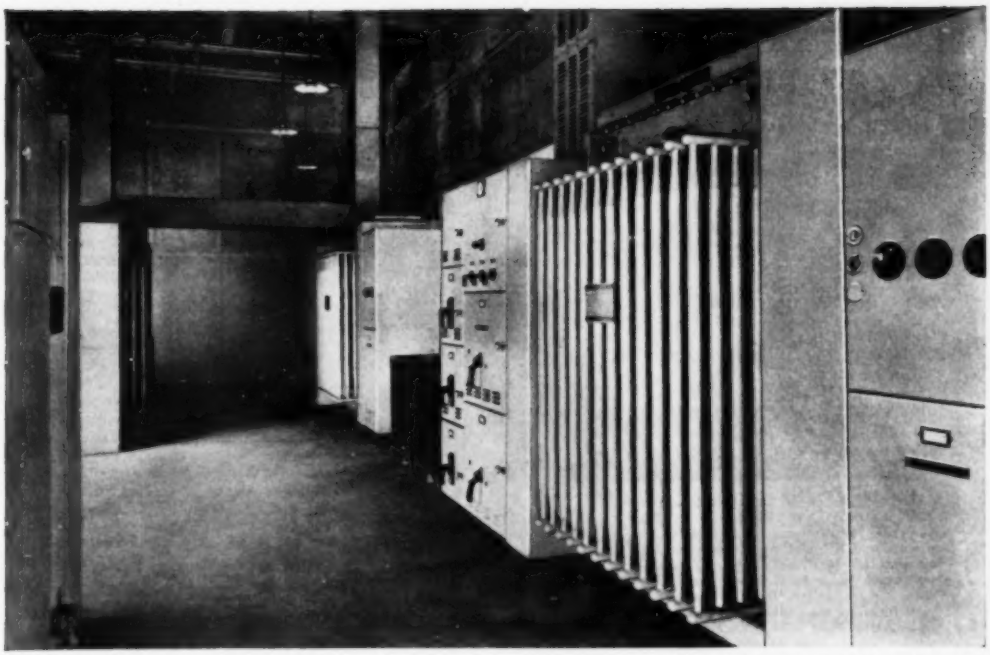
Engineered power system is key



STEP-DOWN TRANSFORMER and control, through which voltage is reduced to suitable levels for operating Crown Mine's auxiliary hoist, was engineered to meet mine's specific needs.

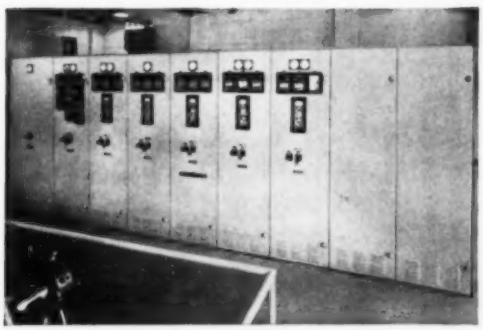


SYNCHRONOUS MOTOR-GENERATOR SET, rated 750 kw, supplies adjustable-voltage d-c power to motor driving the automatic main hoist. Set is controlled from plant's switchgear.



LESS VOLTAGE DROP takes place when plant voltage is stepped down close to points of use. These 4 G-E load-center unit substations at Crown Mine (2 at left, 2 at right), reduce voltage from 4160 to 480 to feed plant motors.

to Crown Mine's 800-tph output



HIGH-VOLTAGE POWER is distributed through this metal-clad switchgear lineup, where various mine and plant functions are sectionalized so that service interruptions are at a minimum.

Co-ordinated G-E equipment provides high service continuity, minimizes shutdowns

Modern is the word for Freeman Coal Mining Corporation's new Crown Mine at Farmersville, Illinois, with a rated capacity of 10,000 tons per day of coal. And modern is the word for its power distribution system, engineered and equipped by General Electric to assure high service continuity, integration of underground and surface operations, and consistently high output.

Just as G-E engineers utilized every applicable technique to co-ordinate Crown Mine's electric equipment into an efficient, low-cost system, they can do the same for your mine. To find out how, contact your local G-E Apparatus Sales Office—soon. General Electric Company, Schenectady 5, N. Y. 663-30

Engineered Electrical Systems for Coal Mines

GENERAL ELECTRIC

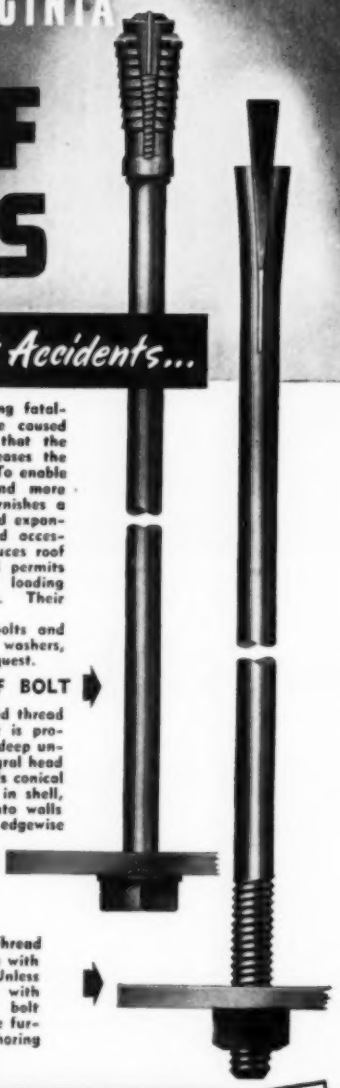
WEST VIRGINIA

ROOF BOLTS

Help Prevent Accidents...

Over 48% of all coal mining fatalities in 1950 and 1951 were caused by roof falls. Records show that the proper use of roof bolts decreases the number of such accidents. To enable operators to obtain better and more secure roofs, West Virginia furnishes a complete line of wedge type and expansion sleeve type roof bolts and accessories. Either type of bolt reduces roof falls, increases ventilation, and permits easier and safer operation of loading and transportation equipment. Their use spells economy.

Circular describing use of bolts and illustrating plate washers, angle washers, roof channels, etc., sent on request.



EXPANSION SLEEVE ROOF BOLT

Consists of ¾ in. cut or rolled thread bolt and expansion unit. Bolt is provided with pressed ears, square, deep unchamfered head and forged integral head washer. Tightening the bolt pulls conical plug into circular tapered seat in shell, forcing teeth of shell fingers into walls of hole without possibility of edgewise distortion.

WEDGE ROOF BOLT

Consists of 1 in. cut or rolled thread bolt slotted for 6 in. and wedge with semi - roughened surfaces. Unless otherwise specified, furnished with regular square nut. Driving bolt against end of hole forces wedge further into slot, thus tightly anchoring bolt in hole.

BETTER PRODUCTS FOR BETTER MINING

West Virginia Steel & Mfg. Co.

Manufacturers of
RAILS and ACCESSORIES
TRACK WORK
STEEL TIES

West Virginia Steel & Mfg. Co.

Huntington, West Virginia

NEWS BRIEFS . . . from p 132

atomic-energy plant the commission will construct in Pike County, Ohio. At the same time, the AEC contracted with Electric Energy, Inc., a group of five private power companies, to raise by 235,000 kw the power it will supply the new AEC plant at Paducah, Ky., raising the total supplied by the group from 500,000 to 735,000 kw. In the original announcement of plans for formation of the Ohio Valley Electric Corp. by 15 utilities and its proposed construction of two steam-generating plants to supply the new AEC Ohio facility (*Coal Age*, September, p 134), the projected power contract was reported as the largest single contract ever undertaken. It is estimated that the two power plants will use about 7,500,000 tons of coal a year. The increased power to be supplied by Electric Energy, Inc., represents 25% of the additional power needed as a result of the expansion program at the Paducah plant, and it is understood that the company will enlarge its generating facilities at Joppa, Ill. The other 75% of the expanded demand the TVA will supply.

Most of July Roof-Fall and Haulage Deaths Preventable

All but two of the 25 July fatalities caused by falls of roof and haulage accidents could have been avoided, John J. Forbes, director of the USBM, pointed out last month in commenting on an analysis of reports by the Bureau's investigating inspectors. Fatalities at all U. S. anthracite and bituminous mines totaled 37 in July, the Bureau's figures showed. Of the 13 fatalities from roof falls, only two could be attributed to unforseen circumstances, Mr. Forbes said. The others resulted from such causes as inadequate roof support, failure to examine the roof carefully or failure to timber in accordance with the company's timbering system. If safety principles had been observed, all the 12 fatal haulage accidents could have been avoided, Mr. Forbes declared.

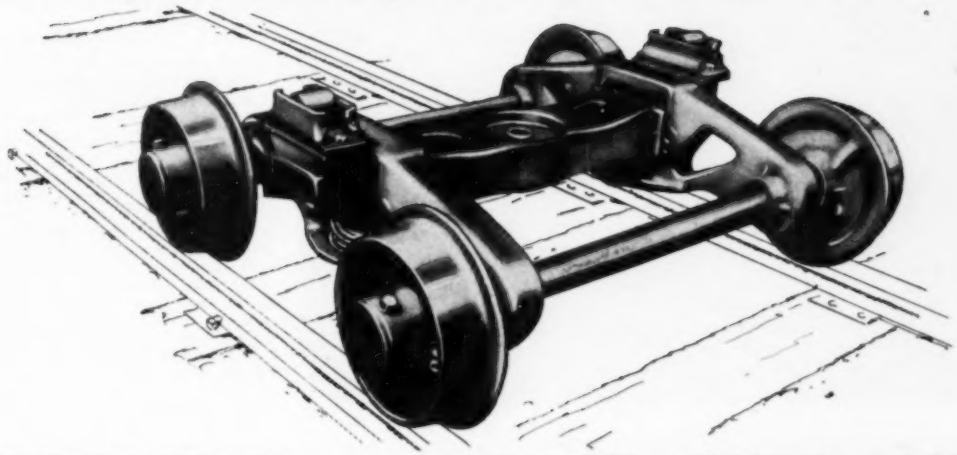
Truax-Traer Marks 25th Year

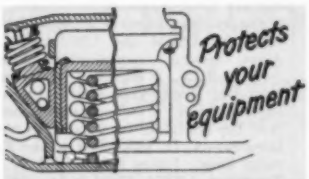
The Truax-Traer Coal Co., Chicago, held a dinner party Oct. 5 in Minot, N. D., to celebrate the 25th anniversary of its starting operations there in 1927. W. E. Keller, vice president, acted as master of ceremonies at the banquet, and more than 15 employees who started with the company on its opening, or joined it within the first year, were presented with wrist watches. R. E. Snoberger, Truax-Traer president, also presented gifts to A. H. Truax, who recently moved up from president to chairman of the board, and to J. O. Westlund, recently retired as vice president and treasurer. Tribute was paid to Mr. Truax's brother, the late Elmer Truax, who originally founded the company.

Big Sandy-Elkhorn Institute Stages 2-Day Safety Meet

Princess Elkhorn Coal Co.'s team from David, Ky., took first place in the white men's division of 11 teams, and Mine No.

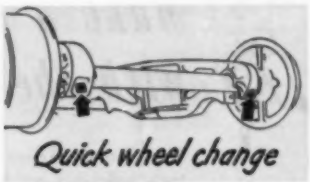
Specify NATIONAL NC-1 trucks for your large 8-wheel mine cars





Shock-absorbing system of the NC-1 truck is similar to designs of the American Association of Railroads for full-size freight car trucks. The oscillation control mechanism (see cutaway) floats your loads over the tracks.

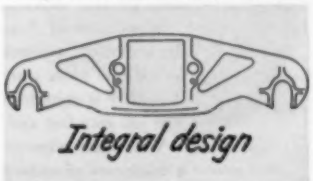
Track irregularities are no hindrance to higher speeds for mine cars when they are equipped with National NC-1 trucks. Truck design and large diameter, low stressed, load-carrying springs improve riding qualities.



Removal of bolt at each end of side frame permits quick wheel and axle assembly change. Cuts repair time and costs . . . keeps cars in operation longer. No lengthy tie-ups for wheel and axle changes on a National NC-1 truck.

The NC-1 truck stays square automatically. V-shaped slots over the axles make it impossible for the truck to get out of square without lifting entire weight of the car body and lading—means longer service, less repairs.

National NC-1 truck's large center bearing provides maximum wear life by reducing per-square-inch loading . . . provides bolster stability. Has easily replaceable centerplate shims and adequate provision for lubrication.



Side frame and bolster are each of one-piece, integrally cast construction similar to the National C-1 trucks used on railroads. Gives maximum strength, minimum weight—has *no welds or rivets to shake loose.* A-3990

For minimum maintenance time and spillage, plus maximum equipment protection—specify National NC-1 trucks on your next 8-wheel mine car order.

NATIONAL Products FOR TRANSPORTATION AND INDUSTRY

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

Willison Automatic Couplers • Friction & Rubber Draft Gears • Car Trucks • NACO Steel Wheels • NACO Steel Links & Swivel Hitchings

Make a double play with these liner plates

When you use Armco Liner Plates in the mining game, both inefficiency and high costs are out. This is why you see more and more of them in use throughout the industry.

The corrugated metal design of Armco Plates insures uniform, safe strength for underground and surface structures without excess weight or bulk. And you select exactly what you need to meet your requirements from a wide range of sizes and gages.

Installation of Armco Plates is quick and simple. An unskilled workman can carry a lightweight section and bolt it into place using only a structural wrench. Assembly is completed from the inside. The job goes fast and costs are low.

With these mine-proved plates you get structures that require a minimum of maintenance. You are assured continued safety and fire-resistance.

You will find Armco Liner Plates save you time and money in the construction of overcasts, shafts, sloped or vertical entries, storage bins and other underground or surface installations. Write for complete information. Armco Drainage & Metal Products, Inc., 3512 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO LINER PLATES

ARMCO

EQUIPMENT APPROVALS

Two approvals of permissible equipment were issued by the U.S. Bureau of Mines in September, as follows:

Joy Mfg. Co.—Type 11BU-11APHY loading machine; one 4-hp and one 75-hp motor, 380 v, AC; Approval 2-875A; Sept. 11.

Goodman Mfg. Co.—Type 865-B Tractor-Tread loader; two 10-hp and two 20-hp motors, 250 v, DC; approval 2-876; Sept. 22.

204, Consolidation Coal Co. (Ky.), Jenkins, was winner among the nine teams in the colored men's division, in the annual first-aid contest held by the Big Sandy-Elkhorn Coal Mining Institute at Pikeville, Ky., Sept. 27. In the mine-rescue contest the previous day, Consol's Mine No. 204 led the four teams participating, with Inland Steel Co., Wheelwright, second, and Consol's Hendrix mine third. In the first-aid contest, white division, the Elkhorn Coal Corp., Jack, Ky., was second, followed by Consol's Hendrix mine. A Princess Elkhorn team placed first in the boys' contest, and an Inland Steel team led the girls' division.

The meet was sponsored by the institute, in cooperation with the Big Sandy-Elkhorn Coal Operators' Association, the Kentucky Department of Mines and Minerals, the USBM and UMWA. A. M. Ayres, general superintendent, Russell Fork Coal Co., is president of the institute; the secretary is J. H. Mosgrove, safety director of the operators' association. Top officials of the 2-day meet were: Directors—A. D. Sisk, chief of the Kentucky Dept.; James Benson and W. H. Tomlinson, USBM. Chief Judges—W. R. Park, USBM; and Elmer Layne, Kentucky Dept. Supervisors—George Colbert and Harry Burdelsky, USBM.

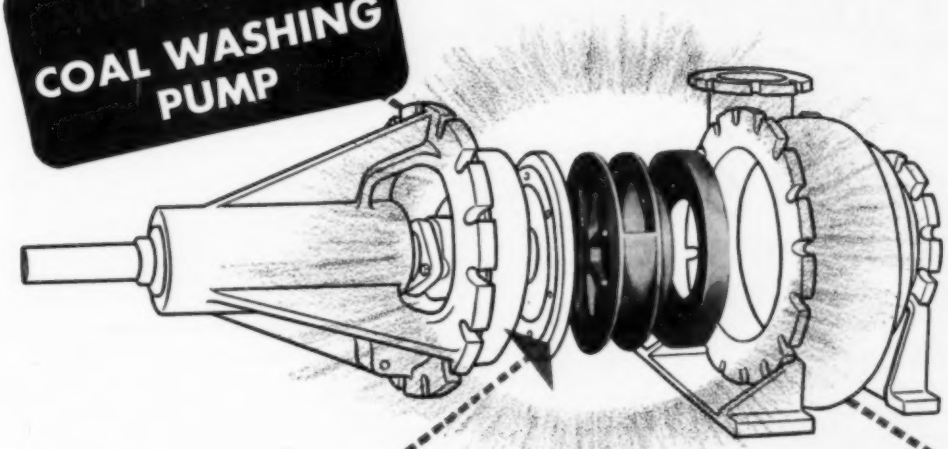
UMWA Asks $1.90 Daily Boost In Anthracite Negotiations

In spite of the WSB's refusal to sanction payment of the full $1.90 a day increase negotiated in the bituminous industry (see p 131), the UMWA is insisting that anthracite operators agree to that figure in writing a new contract, it was reported from Washington Oct. 23. During negotiations that day, in which Mr. Lewis participated during the morning session, the operators did not finally reject the demand. Reportedly, however, they were loath to accept it until the bituminous situation had been cleared up. Anthracite miners continued to work during the bituminous stoppage under a previous interim arrangement calling for an immediate increase from 30¢ to 50¢ a ton in the welfare payments and eventual agreement on the wage hike won by bituminous miners, with the understanding that wage rates would be simplified.

Upswing in Australian Coal May Restrict Machinery Import

A sudden turn in Australian coal production and the resulting oversupply of coal are expected to change Australian

COAL WASHING PUMP



50% Increase in Impeller and Wear Plate Hardness Gives Longer Pump Life

COAL WASHING PLANT OPERATORS can now expect longer service than ever before from Allis-Chalmers Coal Washing Pumps. Impellers and suction wear plates, parts of the pump receiving greatest wear, have been increased from approximately 400 to 600 Brinell through the use of *Ni-Hard* for these parts as standard equipment at no extra cost. Replacement impellers and suction wear plates for Allis-Chalmers Coal Washing Pumps now in service can be furnished in *Ni-Hard*.

EASY TO SERVICE

All parts of the Allis-Chalmers Coal Washing Pump are easy to remove and replace. The rotating element can be removed and replaced in a half hour. Parts subjected to varying rates of wear are separated into easy-to-handle sections. Standardization of bearing support bracket parts makes many parts interchangeable between different pump sizes and reduces parts inventory when you operate more than one pump.

COMPETENT APPLICATION ENGINEERING

Allis-Chalmers application engineers are thoroughly familiar with all types of coal washing equipment problems. Allis-Chalmers can furnish you a complete pumping unit — pump, motor, control and drive — all of coordinated design and manufacture. For help on your coal washing problems, call your nearest Allis-Chalmers District Office. For more information on the A-C coal washing pump with *Ni-Hard* impeller and wear plate, write Allis-Chalmers, Milwaukee 1, Wis. for Bulletin 08B6381.

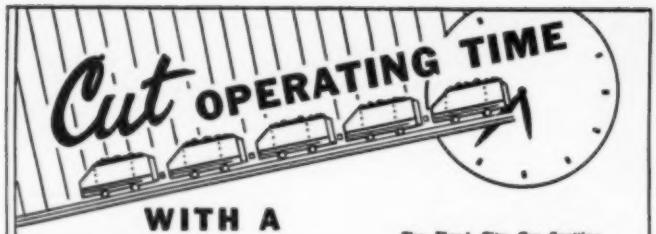
A-3996

Simple construction. Only five wearing parts: shaft sleeve, impeller, casting, two wear plates. All easy to handle and easy to replace.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

Milwaukee 1, Wisconsin



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CAR SPOTTING HOIST

The Flood City Car Spotting Hoist features a quiet, self-oiling worm gear reducer rated at 6000# rope pull at 35 ft./min. INHERENTLY NON-REVERSIBLE DRIVE holds drum stationary when motor is stopped. ANY STD. MAKE OF MOTOR IS USABLE. Sturdy jaw clutch frees the drum for coupling the trip.

SPECIFICATIONS: Length, 7'; Width, 29½"; Height, 30½"; Weight, 2195 lbs.; Rope Capacity, 500 ft.—⅝", 750 ft.—½". Channel iron frame with solid steel bottom . . . completely guarded . . . all parts readily accessible.

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Heavy Capacity Equipment For Changing High Voltage AC to DC

One of two 300 KW, 285 volt d-c Selenium Rectifier Units providing the d-c power requirements of a large coal mine

They are designed for industrial applications such as supplying constant voltage power for DC mining, elevator, machine tool and crane motors. An economical means of obtaining DC power for the excitation of synchronous motors, magnets, magnetic chucks, arc lights, etc. They provide 125 volt to 550 volt direct current. Selenium Rectifiers provide—low installation, maintenance and operating costs, high efficiency and good regulation. The basic unit consists of three phase, insulated transformer and selenium rectifier stacks enclosed in properly ventilated metal casing. 3 KW and smaller single phase, small capacity units are also available.

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plans for the purchase of coal mining machinery and equipment in the U. S., it was reported from Melbourne last month. For some years Australia has been hampered by severe coal shortages and the government has given high priority to improving mining methods and the importation of modern machinery. Currently, the main obstacle to industry prosperity appears to be the lack of modern handling and transportation equipment and it was expected that purchases in the U. S. would be concentrated on that type of machinery. The current surplus and accompanying local unemployment also was expected to strengthen the traditional hostility of Australian miners to continuing mine mechanization. At the same time, some parts of the country are importing coal from India, while northern Australia continues its export of coal to India's neighbor, Pakistan.

NCA Education Committee Studies Salesmen Training

Preceding the regular meeting of the Education Committee of the National Coal Association, a special meeting to discuss the plan for a course for coal salesmen was held Oct. 9 in the School of Mineral Industries, Pennsylvania State College. For the discussion, William Bayfield, executive vice president, American Coal Sales Association, was invited to join with H. C. Woods, J. D. Battle, R. W. Beamer and M. D. Cooper, representing the NCA; R. T. Laing, executive secretary, Central Pennsylvania Coal Operators' Association; and staff members of the School of Mineral Industries. During the meeting, other courses and material were reviewed, and it was suggested that a plan be prepared for a course to be given the last 2 wk of June, 1953, at Penn State, between Commencement and the start of summer school. At its regular sessions held Oct. 10 and 11, the committee heard various faculty members and officials of the college describe its courses and facilities for instruction and research. Committee members present included: Messrs. Woods, Beamer, Battle and Cooper; L. I. Cothern; Davis Read; W. J. Schuster, substituting for J. D. Reilly; and Dr. M. Edmund Speare.

9-Mo Company Earnings

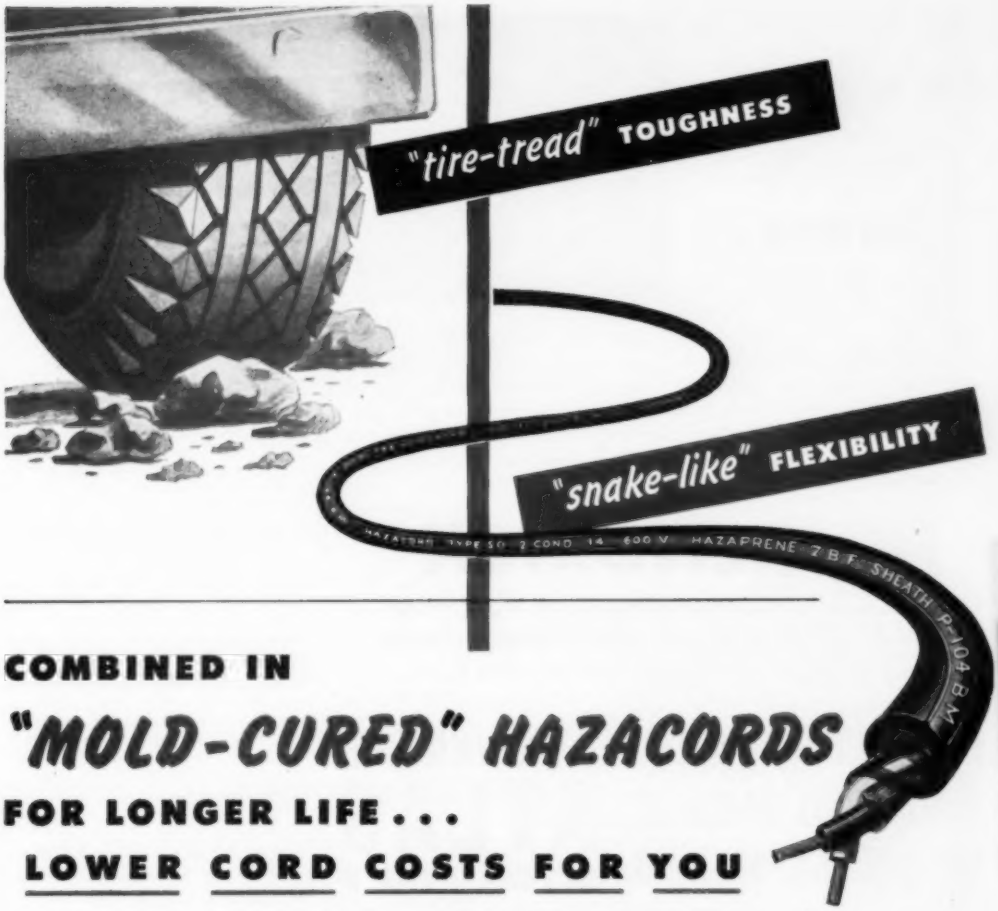
In each case, earnings reported are for the 9 mo of 1952 to Sept. 30, compared to the same period in 1951:

Island Creek Coal Co. and subsidiaries—1952 net profit of $2,117,105, or $1.69 per common share after perferred stock dividends, on sales and operating revenues of $32,241,623; 1951 net of $3,950,091, or $3.23 per common share, on operating income of $39,520,644.

Lehigh Valley Coal Corp. — 1952 net loss of $931,261 on gross sales of $19,919,250; 1951 net loss of $198,134 on sales of $24,137,023.

Pond Creek Pocahontas Co. and subsidiaries—1952 net of $1,194,216, or $3.52 per share, on net sales of $15,656,772; 1951 net of $1,837,828, or $5.41 a share, on sales of $16,994,700.

West Virginia Coal & Coke Corp. —



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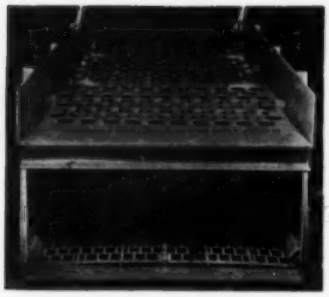
You've probably found it true too, that the service life of portable cords and cables – the true measure of cable economy – depends primarily on the toughness, lasting qualities and flexibility of the sheath. Today's Hazacords are the result of many years of Hazard and Okonite experience in developing portable cable and cords for unusually severe service in every type of industry.

Every Hazacord is protected with the specially developed Hazaprene ZBF Sheath. *It's cured under pressure in a continuous metal mold* which assures optimum vulcanization, maximum density, lasting toughness, a smooth, wear-resisting surface – and at the same time, ample flexibility is maintained. The Hazaprene ZBF Sheath is a time-proved neoprene compound with maximum resistance to oils, acids, chemicals, moisture and weather. In addition, it is highly flame-resistant – more than meets the flame test requirements of the Federal Bureau of Mines and the Pennsylvania Department of Mines. All Hazacords are insulated with tough, heat-resisting, long-aging rubber compound for full electrical protection.

It will pay you to get all the facts about Hazacord. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

For heavy-duty vibrating screens



Accuracy of sizing, freedom from clogging, and high production is assured when Hendrick Perforated Metal Plate is used on vibrating and shaking screens. Uniformity of mesh is maintained throughout unusually long service life.

Hendrick Perforated Plate can be furnished, either flat or corrugated, with any desired shape and size of perforations, in proper gauges of high carbon and stainless steels.

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The Type-F locomotive is no bigger than the average mine car. It can go anywhere in the mine without brushing. Built like a big trolley locomotive with two motors, one driving each axle. Users say they are the best in the world.

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1952 net profit of $314,899, or 63¢ each on 500,000 shares, on operating revenues of $14,631,958; 1951 net of $671,453, or $1.60 each on 420,000 shares, on revenues of $15,951,001.

And For Your Information . . .

Some 3,566 suggestions were received from employees of the Peabody Coal Co. in a company-wide contest to name the coal being produced from the new Peabody No. 10 mine. The winning name, "Dynamo," picked by a board of judges brought $100 checks to Sam Ladic, foreman at the new mine, and John Dudra, repairman at Mine No. 17, presented personally by Stuyvesant Peabody Jr., company president.

New equipment installed by the Mining and Metallurgical Department of the University of Illinois makes its new mine ventilation laboratory one of the most modern and complete in the U. S., it is reported. One of the two new fans recently acquired is capable of ventilating a small mine.

A 20¢ increase in the price of anthracite coal was authorized by the OPS Oct. 2 to compensate for the boost in welfare fund royalties. Several days earlier, OPS had okayed a 35¢ increase in the retail price of anthracite, as required under the agency's earning standards.

Britain's first large new colliery to go into production since nationalization was opened at Calverton late in September. The mine's two shafts, some 1,600 ft deep, tap about 130 million tons of coal. It will mine 1¼ million tons annually and employ 1,800 men.

New Books for Coal Men

Mechanical Design

Introduction to Mechanical Design, by T. B. Jefferson and W. J. Brooking. Here's a book written for men whose background in design of machinery is not extensive. Starting at the beginner's level, the book stresses design requirements, economics, desired final appearance, materials, processes, machine frames, lubrication, piping, tubing and styling. *612 pp. $6.50, The Ronald Press Co., 15 East 26th St., New York City 10.*

How Thick Are Our Coal Seams?

Thickness of Bituminous-Coal and Lignite Seams at All Mines and Thickness of Overburden at Strip Mines in the United States in 1950, by W. H. Young and R. L. Anderson. For the last 30 yr coal has been taken from seams of substantially the same thickness—about 63 in—says this new Bureau report. In general, the study dispels the idea that our coal must come from thinner seams as the years pass. As for stripping, the average thickness of overburden in 1950 was 39 ft, against 31.6 in 1946. In 1950, the ratio between depth of overburden removed and thick-

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the ONLY Safety Shoes with

BoL Tan®

Sweat-resistant Leather Insoles!

H713-3
Men's Black Glove Blucher, Neocord out sole, Resist Oil midsole, Neocord heel, Anchor Flange Steel Box Toe, Protector Last, BoL Tan leather insole.

ADD UP TO TWICE THE WEAR!

No other safety shoe offers the benefits of the exclusive, new *BoL Tan* sweat-resistant leather insole. HY-TEST Safety Shoes now increase worker comfort and productiveness with *BoL Tan* leather insoles in every pair.

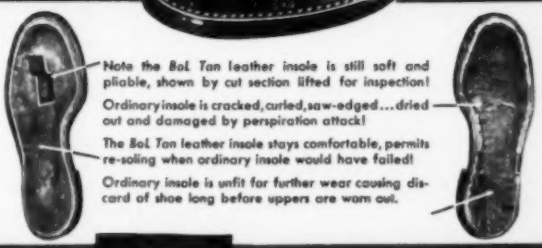
The life of any shoe depends on the insole. That's why *BoL Tan* sweat-resistant leather insoles extend shoe life as much as 100%, because they withstand the damaging effects of foot perspiration.

This means that your workers and all wearers of safety shoes can increase the *value* of their purchases and be more comfortable while at work when they buy and wear HY-TEST SAFETY SHOES.

Only the BoL Tan leather insole resists the damaging effects of perspiration!

AT NO EXTRA COST!

Here are two insoles from a single pair of shoes worn in a foundry for seven months. The one from the left shoe is a *BoL Tan* leather insole; the other is a regular quality leather insole.



Note the *BoL Tan* leather insole is still soft and pliable, shown by cut section lifted for inspection!

Ordinary insole is cracked, curled, saw-edged... dried out and damaged by perspiration attack!

The *BoL Tan* leather insole stays comfortable, permits re-soling when ordinary insole would have failed!

Ordinary insole is unfit for further wear causing discard of shoe long before uppers are worn out.

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Please send me free copy of your folder explaining the advantages of BoL Tan leather insoles.

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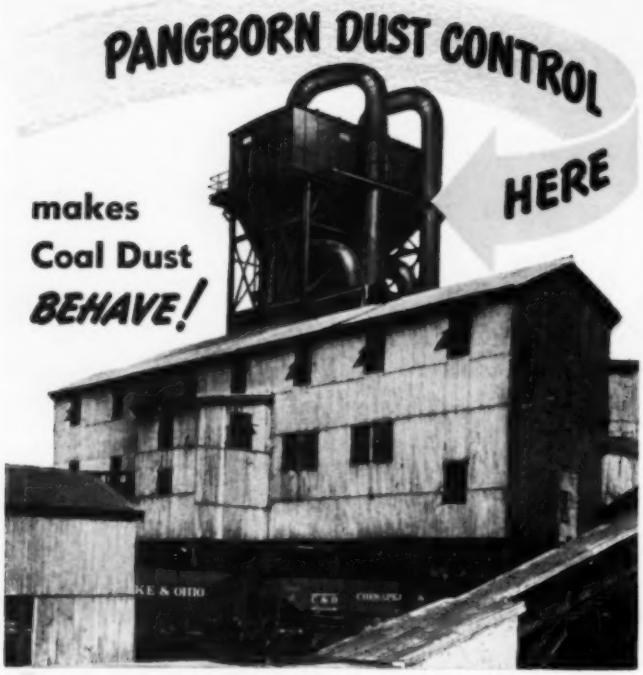

Floating coal dust in your plant costs money! If you want to save that money, do as scores of high-profit coal preparation plants do—*make coal dust behave* with Pangborn Dust Control!

Efficient Pangborn Dust Control gives you superior (and more profitable) reclamation. Machinery lasts longer, explosive hazards are reduced, working conditions improved because Pangborn *stops dust* from tipples, dry cleaning, dedusting and many other operations.

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Look to Pangborn for the Latest Developments in Dust Control and Blast Cleaning Equipment.

STOP THE DUST HOG
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ness of seam mined was 8 to 1. These and other interesting facts are included in the booklet. *USBM, I. C. 7642. 18 pp. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Detecting Gas

A Practical Method for Teaching Mine Workers and Officials Use of Gas-Detecting Equipment, by D. S. Kingery and F. D. Baker. This booklet gives details of a 20-hour experimental course including lectures, demonstrations and practical work. Instruction materials include several testing boxes and a large walk-in gallery. To some extent, underground conditions are simulated. *USBM, I. C. 7639. 6 pp. 8x10½-in, paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Help for Coal Users

How to Reduce Stack Dust From Small Stationary Plants. If your customers who use coal in small stationary plants up to 300 boiler hp have trouble with cinders and flyash, this new "Aid to Industry 500-320," second in a new series published by Bituminous Coal Research, Inc., will help them. *12 pp. 8½x11-in; paper. 40¢ per copy to non-BCR members; 25¢ to members. Bituminous Coal Research, Inc., 2609 First National Bank Building, Pittsburgh 22, Pa.*

Mining With the Coal Plow

Modified Longwall Mining With a German Coal Planer (Plow) in the Pocahontas No. 4 Coal Bed, Helen, W. Va., by W. A. Haley, J. J. Dowd and L. A. Turnbull. Here's the Bureau's story of what happened when a German coal plow was put on longwall work in a 328x1, 441-ft block of 34-in-thick coal. You'll find the *Coal Age* story of the same operation on p. 76 of this issue. *USBM, R. I. 4922. 13 pp. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Other Books and Booklets

Structure of Coal in the Deep River Coal Field, North Carolina, by J. A. Reinemund. Maps, U. S. Geologic Survey. On view at USGS office and at General Services Administration, Washington, D. C., and at N. C. Dept. of Conservation & Development, Raleigh, N. C.

The following publications by the U. S. Bureau of Mines are available free upon request to Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. All are 8x10½-in; paper; mimeo.

Some Characteristics of the Earth As a Conductor of Electricity, by M. C. McCall and L. H. Harrison, R. I. 4903. 9 pp.

Ventilating Practices That Minimize Explosion Hazards in Bituminous Coal Mines, by M. J. Ankeny, James Westfield and D. S. Kingery. I. C. 7648. 6 pp.

Preparation Characteristics of Coal From Pike County, Ky., by W. L. Crentz and J. W. Miller. USBM, R. I. 4910. 28 pp.

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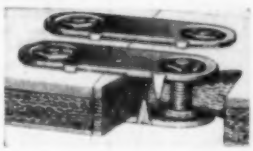

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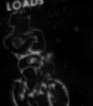

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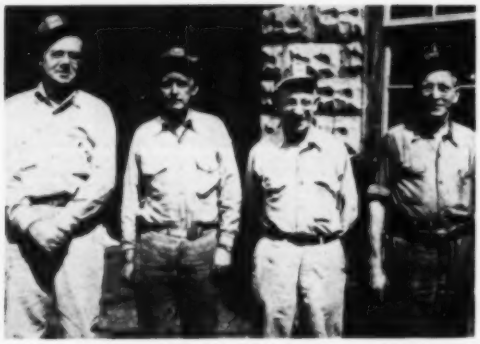

COAL MEN ON THE JOB . . .

MACALPIN COAL CO., McAlpin, W. Va. (left photo): Eric H. Brown (left), roofbolt engineer, USBM, Mt. Hope, W. Va.; G. F. Bane, general mine foreman, J. A. Baritell, general superintendent, and R. A. Cunningham, chief electrician and master mechanic, MacAlpin Coal.

BOWMAN ELKHORN COAL CO., Esco, Ky. (right photo): Jack McCann (left), general mine foreman, and Charles Calhoun, chief electrician; and Jesse Lewis, safety director, Eureka Casualty Co., Pineville, Ky.

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HYDRAULIC hand-operated

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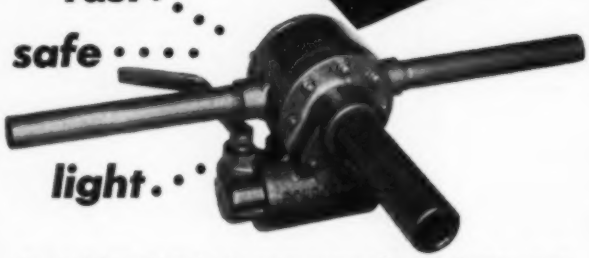
light . .



Powered from the hydraulic power system of standard mining equipment, the Schroeder 12-B Coal Drill provides plenty of power for fast drilling with complete operational safety - never any spark, kick, or shock - all electrical hazards are removed yards from the drill! Lightweight and dependable, its design simplicity and minimum of parts result in greatly reduced maintenance costs.

Call or send in coupon today.

Typical FAST HOLES Drilled with the NEW SCHROEDER COAL DRILL

Pittsburgh Seam: 9' x 2" hole . . . . . 23 sec.
Island Creek Seam: 8' x 1¼" hole . . 36 sec.
Freeport Seam: 8' x 3" hole . . . . . 12 sec.

SCHROEDER BROS., 3116 Penn Ave., Pittsburgh 1, Pa.
We are interested in the new Schroeder 12-B Coal Drill
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HYDRAULIC ELECTRIC & PNEUMATIC MINING EQUIPMENT
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It is not necessary to change your present machine to accomodate our Vibrator Screens. The wedge shape of the screen wire with its non-clogging, non-blinding features permits perfect separation on wet or dry screening. The rigid construction adds considerably to the screens capability and efficiency. Proven in hundreds of installations.

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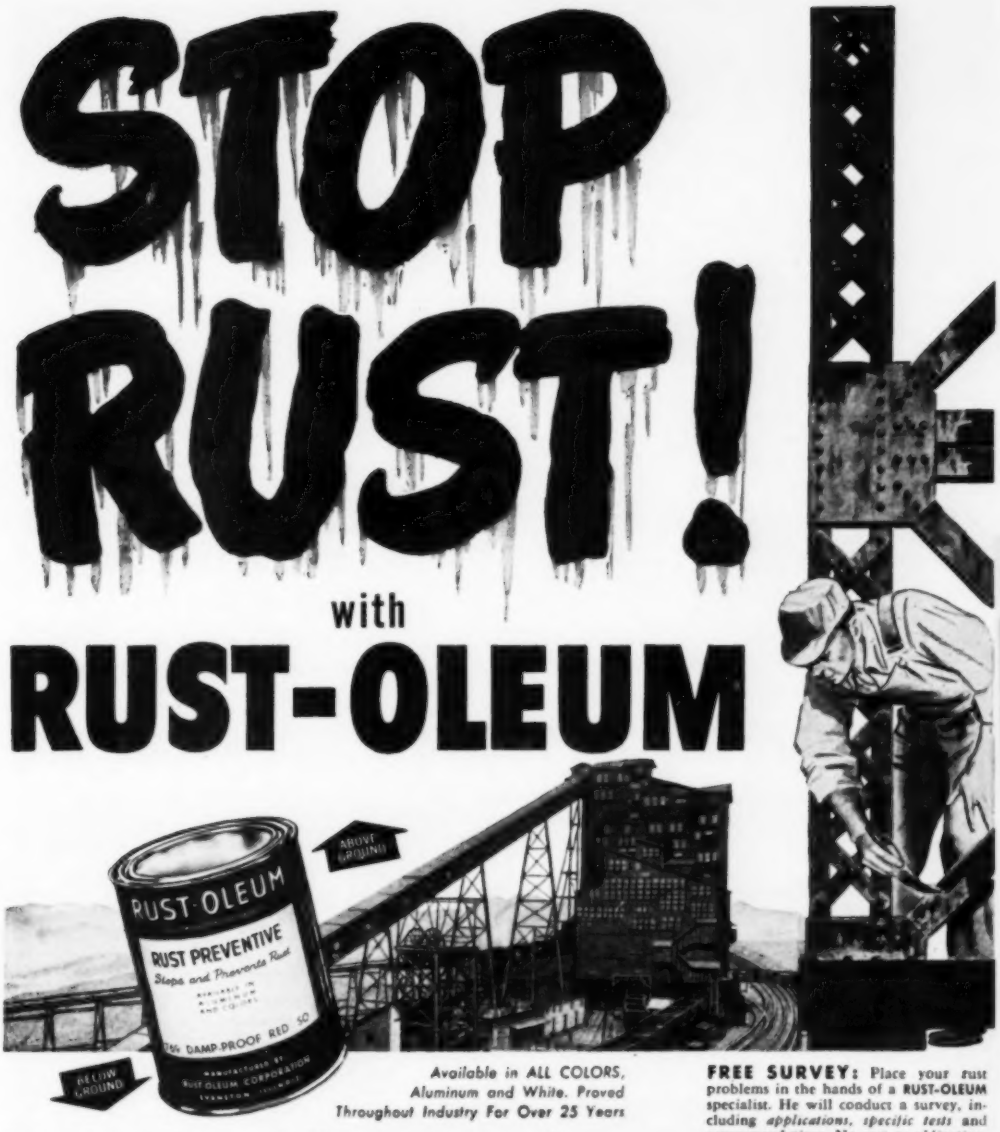
Wedge-Wire CORPORATION
5602 CLARK AVE. CLEVELAND 2, OHIO

STOP RUST!

with RUST-OLEUM



Available in ALL COLORS, Aluminum and White. Proved Throughout Industry For Over 25 Years

Deep underground pipes, coal cars, machinery — tipples and surface equipment — all *rustable* metal surfaces need **RUST-OLEUM!** The *exclusive* formula that resists fumes, moisture, weathering, most acids and chemicals! Goes on easily by brush, dip or spray . . . dries to a firm, *decorative* finish!

May be applied over surfaces *already rusted* after wirebrushing and scraping. Specify **RUST-OLEUM** to your painting contractor or maintenance department for new construction, maintenance or remodeling. Prompt delivery from Industrial Distributor stocks in principal cities. Write for *complete* literature — *today!*

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2461 Oakton Street — Evanston, Illinois

FREE SURVEY: Place your rust problems in the hands of a **RUST-OLEUM** specialist. He will conduct a survey, including *applications, specific tests* and *recommendations. No cost or obligation.* See Sweets for catalog and nearest **RUST-OLEUM** distributor, or write for literature on your company letterhead.

It's Easy To Get The Facts — Clip This To Your Letterhead

- ☐ We Have A Rust Problem — Have A Qualified Representative Call
- ☐ Free Survey
- ☐ Complete Literature
- ☐ Nearest RUST-OLEUM Source

FASTER, EASIER BLAST HOLE DRILLING

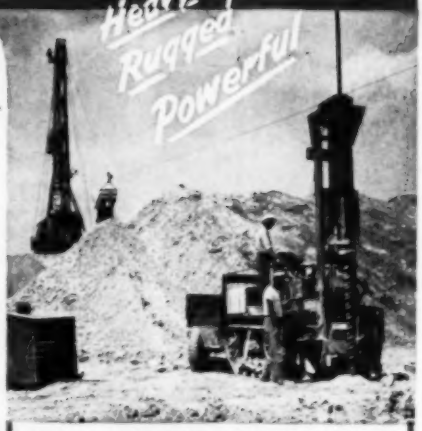
McCarthy Auger Drills

A McCarthy Drill, working eight hours, can keep the big shovels busy around the clock.

Time and again McCarthy Drills get the nod from operating men . . . men who've made actual tests proving that no other equipment can match a McCarthy for speed, stamina and versatility.

At The Bessemer Limestone and Cement Company, Bessemer, Pa., one McCarthy unit averages 90 ft. per hr., working through a facing of blue shale 34 ft. deep. Holes are drilled on 18-ft. centers. Two men handle the whole job, including setup and moving. Another McCarthy unit has been installed in a different section of this quarry and it, too, is breaking all previous records for fast, low cost shot hole drilling. McCarthy Drills operate with all types of power units on all types of mounts. Write today for full facts about this finger-tip controlled money saver.

McCarthy truck-mounted Horizontal Drills keep men and equipment off of the ground, up out of the mud. All McCarthy units are adjustable to necessary drilling angles. Finger-tip controls and six-foot interlocking auger sections provide unlimited drilling opportunity. Self-propelled models also available.



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SALEM, OHIO • U. S. A.

NOW-"real" low type Storage Battery Locomotives

Low type RANGER
Height—25" to 33" depending on battery capacity required.
Weight—3T to 5T. Track Gauge—18" to 56½".

Low type MONITOR
Height—26" to 33" depending on battery capacity required.
Weight—6T to 10T Track Gauge—18" to 56½".

All Greensburg Storage Battery Locomotives are custom built to your individual requirements in single or double motor drives with drum or contactor type controllers. Because of their modern engineered design, our locomotives have, time after time—on job after job, proven themselves more efficient . . . given longer battery life and outperformed all other storage battery locomotives of equal weight and battery capacity.

GREENSBURG MACHINE CO. 102 STANTON ST., GREENSBURG, PA.

You can save on every grinding job with Norton wheels

For every grinding job you do, below ground or above, there's a Norton wheel with just the right combination of abrasive, bond, grain size and structure to save you time, labor, and money. For example:

- Norton ALUNDUM* wheels cover the widest range of applications. They're unequalled for sharpening high-speed steel tools and for grinding other hard, high-tensile-strength materials. E.g. A30-05VBE.
- Norton regular 37 CRYSTOLON* wheels assure maximum economy in grinding gray iron and the nonferrous metals. E.g. 37c2.4-Q5V.
- Norton green 39 CRYSTOLON* wheels in the new vitrified K-bond are particularly adapted for sharpening carbide tipped bits and cutters. E.g. 39c60-I8VK.

In Norton *Reinforced* Hub wheels, resinoid bonded, safety and versatility are emphasized. Their uses on portable grinders include weld grinding and other smoothing operations, also cutting-off and notching.

Your Norton Distributor Can Give You Valuable Help

Besides his own practical experience with abrasive applications in the mining field, your Norton Distributor can call in Norton Abrasive Engineers for additional expert aid in solving your grinding problems. Take advantage of the wide store of helpful knowledge he makes available to you. See him for the right wheels to use in any grinding job. NORTON COMPANY, WORCESTER 6, MASS. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

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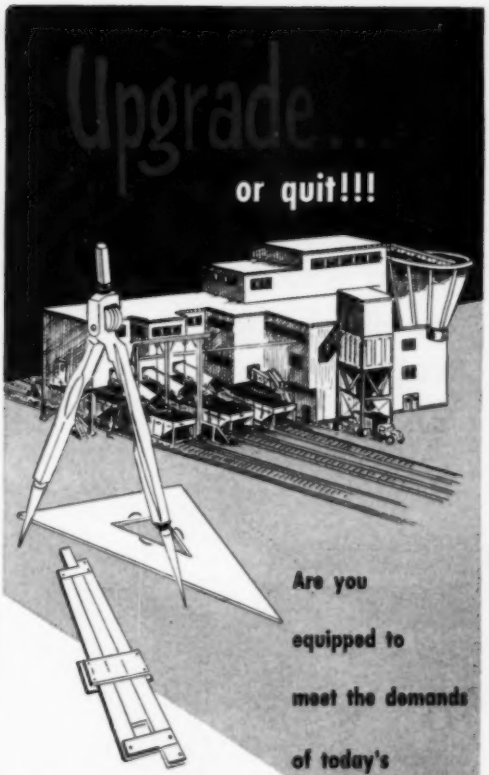
Making better products to make other products better



LOWER your production costs! Installation of carefully selected preparation plant equipment, competently engineered, will decrease labor costs and increase your realization by upgrading your product.

An informal discussion of your coal preparation problems and a tentative survey of your present facilities may be arranged without obligation.

There will always be a Market for Quality Products

Templeton-Matthews moderate fees average less than 5% of the total job cost. For further information write today!

TEMPLETON-MATTHEWS CORPORATION

REGISTERED PROFESSIONAL Engineers

608 Sycamore Building • Terre Haute, Indiana

Men who depend on power...know they can depend on CUMMINS®

Every CUMMINS DIESEL is built not once but twice

Miners have learned to count on Cummins Diesels for dependable power day in, day out.

What's behind this consistent reliability? One good reason is the fact that every Cummins Diesel is actually built *twice*. After initial assembly, and run-in testing, every engine is disassembled, inspected; then reassembled and tested again.

This extra care—together with Cummins' economy-proved fuel system and efficient parts and service organization—makes lightweight, high-speed (50-550 h.p.) Cummins Diesels a wise first choice *for men who depend on power.*

Whatever your power needs . . . whether it's for stripping or hauling, portable power units or generator sets—or any other important jobs . . . your Cummins dealer is the man to see.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana

Export: Cummins Diesel Export Corporation
Columbus, Indiana, U.S.A. • Cable: CUMDIEX

CUMMINS DIESEL

TRADEMARK REG. U. S. PAT. OFF.

Leaders in lightweight, high-speed diesel power!

Among the Manufacturers

E. D. Tull has been amed to the newly created position of vice president and general manager, Cummins Engine Co., Inc., Columbus, Ind. With the company since 1928, Mr. Tull was made vice president of personnel and plant last February and recently was elected to the board of directors. C. B. Foster has been appointed to the newly created position of sales manager-engines, for the company. In his new capacity, Mr. Foster also will continue to be in charge of all government contract work. Before joining Cummins in 1950, Mr. Foster was assistant to the operating vice president of the Truax-Traer Coal Co. and also was assistant to the vice president in charge of sales, Bucyrus-Erie Co., for a number of years.

Firth Sterling, Inc., Mining Div., Pittsburgh, has appointed E. E. McAllister salesman in the Princeton, W. Va., territory. Before joining Firth Sterling, Mr. McAllister was employed by the Peabody Coal Corp. and by the Old Ben Coal Corp. as foreman and also was a mine inspector for the USBM for 2 yr.

John Hellstrom, vice president, American Air Filter Co., Louisville, Ky., has been appointed director of sales of all AAF and Herman Nelson products, returning from San Francisco, where he organized and managed the company's Pacific Div. The sales and advertising departments of the Herman Nelson Div., Moline, Ill., are to be moved to Louisville, and assisting Mr. Hellstrom will be Robert W. Nelson, vice president, formerly of the Herman Nelson Div.

E. M. Webb, vice president and general manager, Duff-Norton Mfg. Co., Pittsburgh, has been elected a member of the company's board of directors. Mr. Webb has been associated with Duff-Norton for 28 yr, having started with the company shortly after graduating from the University of Cincinnati as a mechanical engineer.

William H. Carson has been appointed district manager of the Huntington, W. Va., sales office of the Goodman Mfg. Co., succeeding Morris W. Highland, who has been granted a leave of absence for reasons of health. A graduate engineer of Michigan College of Mining and Technology, Mr. Carson has been a member of the company's Huntington sales force since 1939, the last 2 yr as assistant manager. The Huntington office covers the mining fields of southern West

LaPlant-Choate Becomes Allis-Chalmers Division

COMPANY EXECUTIVES mark Allis-Chalmers' entrance into the motor-scraper field as they inspect this TS-300 scraper following formal acquisition of the LaPlant-Choate Mfg. Co. in September. The company will be operated as the Cedar Rapids, Iowa, works, Allis-Chalmers Mfg. Co. Shown here are: W. E. Hawkinson (left), A-C vice president and secretary; A. D. Dennis, former LaPlant-Choate president and now general manager of the Cedar Rapids works; W. G. Scholl, vice president in charge of the A-C Tractor Div.; and John Ernst, vice president of manufacturing, A-C Tractor Div.

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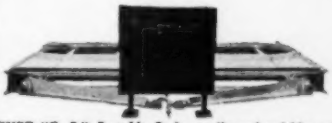
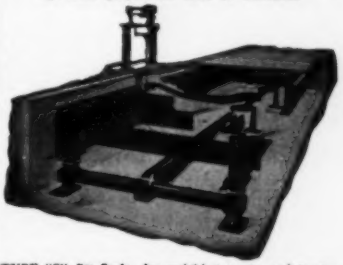
Dependable — Accurate

TRUCK and TRACTOR TRAILER SCALES



TYPE "C. S." *Portable Scale*—easily and quickly set up—with preparation held to minimum



TYPE "S" *Pit Scale*—for weighing trucks and tractor trailers—Platform lengths 18 ft. to 60 ft. inclusive.

WINSLOW SCALE COMPANY

TERRE HAUTE 1, INDIANA

Scale Manufacturers since 1896

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SEACO TRADE MARK

HARD-SURFACING WELDING ELECTRODE

. . . because it gives you all these advantages . . .

- SEACO'S hardness runs 500-600 Brinell over Manganese or Carbon Steel. A single pass allows parts to workharden.
- SEACO has a high resistance to heavy impact and abrasive wear.
- SEACO will not soften from dilution by parent metal.
- SEACO contains 95% metal — only 5% coating. More metal for your money.
- SEACO is fast — runs rapidly at high heat.

FOR STILL LONGER LIFE OF YOUR EQUIPMENT .

Use SEACO over MANGANAL

11%-13½% Manganese-Nickel Steel

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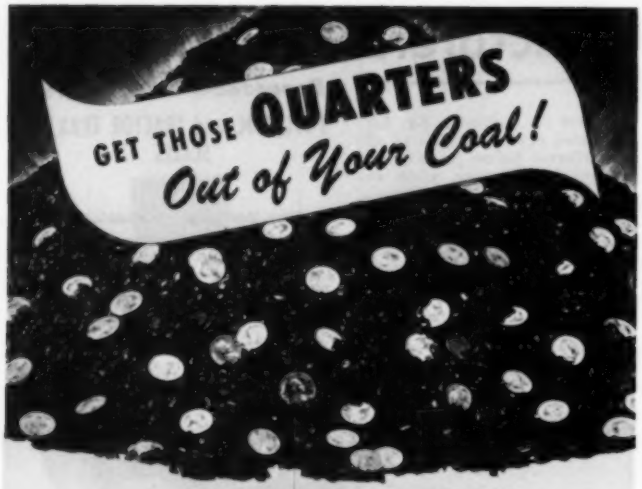
SOLE PRODUCERS 92 N. J. RAILROAD AVE. NEWARK, N. J.

ORDER SEACO TODAY

Write TODAY for FREE Literature on SEACO!

NEAREST DISTRIBUTOR UPON REQUEST



. . . with **OSMOSE**

TREATED MINE TIMBERS

SAVE UP TO 25¢ PER TON. This is it! The competitive coal market is back. All operations must utilize every possible cost-cutting device. Why not *BEGIN* where you can save most? Timber represents 40% to 60% of your supply bill. We can cut this cost by making mine timber LAST LONGER. You save on timber! You save on replacement! With Osmose you can make any wood species, even beech, gum hickory, ash, elm and maple, into long-lasting timbers.

1 **We can furnish you with OSMOSE TREATED TIMBER**

We can supply you with Osmose-treated square-sawed, slabbed or round timbers, ties, collars, posts, lagging, caps, wedges or tipple timbers from one of our treating plants. These select OSMOSE-treated timbers will render many years of EXTRA service.

2 **We will CUSTOM-TREAT TIMBERS furnished by you**

We will OSMOSE-treat your own timber at our nearest treating plant. Remember, this treatment can be applied to ANY wood species, even beech, gum, hickory, ash, elm and maple.

3 **We will furnish MATERIALS and YOU can treat your own timber**

By constructing an inexpensive vat and following directions, you can treat your own green timber with OSMOSALTS.

➡ **WRITE FOR COMPLETE DETAILS ON THE TYPE OF OSMOSE SERVICE YOU PREFER**

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

BUFFALO, NEW YORK

Representatives in: Pittsburgh, Denver, Birmingham Ala., Stollings & Clarksburg, W. Va., and New York City

International Opens New Engineering Building

TO HOUSE its truck design, research and experimental work, the motor truck division of International Harvester has opened this new engineering building and laboratories on the outskirts of Fort Wayne, Ind. With the new facilities, IH has doubled the engineers and technicians working on truck problems, tripled the floor space available and quadrupled the test facilities, it reports. It also maintains proving grounds at Fort Wayne and Phoenix, Ariz.

Virginia, eastern Kentucky, eastern Tennessee, Virginia and North Carolina.

J. D. Greensward has been named vice president and director of manufacturing, general machinery division, Allis-Chalmers Mfg. Co. Mr. Greensward recently was made director of manufacturing, succeeding Fred Mackey, who resigned as vice president in charge of manufacturing. P. F. Bauer has been made general manager of the Norton works and manager of the company's apparatus department, succeeding Mr. Greensward.

George S. Fabel, formerly vice president, has been elected president of the Thermoid Co., Trenton, N. J., succeeding Fred E. Schluter, president of the company since 1935, who resigned to devote more time to outside interests, but remains on the board of directors. With the company for 30 yr, Mr. Fabel was previously president of Southern Asbestos Co., a Thermoid subsidiary, and was made a company vice president last spring. T. J. Ellis, widely known in the rubber industry for his part in the development of the bullet-sealing gas tank during World War II, has been elected a vice president of the company. Mr. Ellis, who joined Thermoid in 1949 after 25 yr in the industry, will direct rubber manufacturing at all the company's plants.

As a part of its recently expanded sales program, Boston Woven Hose & Rubber Co., Cambridge, Mass., has promoted H.

GM DIESEL
CASE HISTORY No. 526-25

USER: Aurora Limestone Products Co., Aurora, Iowa, producers of road stone and agricultural lime.

INSTALLATION: GM 3-71 Diesel powers a ¾ yd. Unit shovel, replacing a ¾ yd. shovel powered by a gasoline engine.

PERFORMANCE: GM Diesel powered shovel works faster, feeding crusher about 17% more per day. Fuel consumption averages 4 gallons per hour, saving 33% on operating costs.

THIS DIESEL LOADS FASTER

and costs 1/3 less to operate

A few days after Aurora put this shovel to work, they rented a 2-cycle General Motors 6-110 Diesel for their portable crusher while the old 4-cycle Diesel was in for overhaul. Production increased from 480 tons per day to 600 tons. Fuel costs dropped from $14.00 per 10-hour day to $9.50. Needless to say, the 6-110 now powers the crusher. With power on every piston down-stroke, fast accelerating GM Diesels enable equipment to do more work each day. They're quick starting—easy to service and cost less to maintain. That's why users tell us "any machine with GM Diesel power is a better machine." Specify GM Diesels for your equipment.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN

It pays to Standardize on

GM
GENERAL MOTORS
DIESEL POWER

"Tycol Acylkup gets cars off fast... keeps them running under all weather extremes"

That's so right! Tycol Acylkup Mine Car Grease reduces low temperature drag . . . retards lubricant leakage at high temperatures . . . permits the handling of more cars per haul. It keeps cars running in top condition inside the mine and out.

Also, Tycol Acylkup's expertly blended calcium soap and specially selected cylinder oil stock combination assure long bearing life . . . less down-time loss . . . lower maintenance costs.

Ask your nearest Tide Water Associated office for complete information. Call or wire today.

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INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C. • Pittsburgh
Philadelphia • Chicago • Detroit
Tulsa • Cleveland • San Francisco

TIDE WATER ASSOCIATED OIL COMPANY

11 BATTERY PLACE · NEW YORK 4, N. Y.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"

S. Johnson to director of merchandising, L. M. Atwood to assistant general sales manager, and J. H. Alsen to director of engineering applications. With the company since 1936, Mr. Johnson will direct the home office sales organization, including advertising, sales promotion and market research. Mr. Atwood, who joined the company in 1948 as western manager of the V-belt department, will be in charge of the general-line field sales force. Mr. Alsen has held various posts with the company since 1920 and will supervise applications and sales to original-equipment manufacturers in his new position.

Stephen T. McGinnis, with the Tennessee Coal & Iron Div. for the past 15 yr, has been named director of public relations for the southeast district of the U. S. Steel Co. He has served as associate director since last January, following the retirement of Ernest D. LeMay. John L. Mortimer, who has been interim director of public relations for the district, continues as director of the Gulf-Southwest district, with offices in Houston.

Rock Bit Sales & Service Co., Philadelphia, has named Joe Klemeyer as general manager and Wayne Burnside as sales manager. Mr. Klemeyer was formerly sales manager of Brunner & Lay, Inc., Franklin Park, Ill., the parent company, and has been succeeded in that post by E. A. Bowman, formerly sales representative for the central states. Mr. Burnside has been associated with Rock Bit Sales & Service for some time.

The Swing is to
Durakool
a dependable
10 YEAR SWITCH
Steel-clad with mercury to mercury contacts, the Durakool hydrogen filled switch is performing with sensational dependability.
★ Millions of contacts without a falter
★ Positive "Make and Break" contact action
★ Withstands high temperatures
★ No deterioration in storage
★ Seven new models—1 to 65 amperes
★ Smaller in size, increased capacity
Send for BULLETIN 525
Steel Durakool
MERCURY SWITCHES
See Telephone Directory for Local Distributor or write
Durakool, Inc. Elkhart, Indiana

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Call on FOSTER for everything in Industrial Track Equipment and supplies.

RAILS New and Relaying

Send for Track Equipment Catalog #C11

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STEEL SHEET PILING • PIPE • WIRE ROPE

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HINGED PLATEGRIP BELT FASTENER No. 5[illegible]

for Conveyor Belts

Specially designed to permit quick and easy method of adding to, or reducing length of belt. Just pull the hinge pin to open joint.

Write for Catalog Sheets. PLATEGRIP for dust-tight permanent joints. HINGED PLATEGRIP for "add-on" belts. REPAIR PLATES for patching worn or repairing torn belts.

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RECLAIM YOUR SLURRY!

To go "all out" for COAL Production, reclaim your SLURRY Coal—No other means will accomplish this more economically than a C·M·I CENTRIFUGAL COAL DRYER!

C·M·I Centrifugal DRYERS

Write or Wire! Let us tell you all about it.
No obligation, of course.

CENTRIFUGAL & MECHANICAL INDUSTRIES
146 President St., St. Louis 18, Mo.

COAL MEN ON THE JOB . . .

Hanna Coal Co., Div. of Pittsburgh Consolidation Coal

D. D. SAXTON, general superintendent, Georgetown No. 12, keeps in constant touch with field operations from his desk via radio-telephone.

Richard T. Bules has been appointed manager, V-belt sales, industrial products sales department, B. F. Goodrich Co., Akron, Ohio, succeeding George J. Fischer, who recently resigned. Mr. Bules, a native of Akron, has been with B. F. Goodrich for the past 12 yr and had held various posts in the sales department until his present appointment.

H. R. Stickel has been named assistant to the president of the White Motor Co., Cleveland, in charge of public relations and national fleet sales. Mr. Stickel has been fleet sales manager at White for the past 7 yr and was associate director of the Div. of Motor Transport in the Office of Defense Transportation during World War II.

Air Reduction Sales Co., New York, has appointed A. S. Blodget Jr. manager of its Pittsburgh district, succeeding the late S. D. Edsall. E. S. Twining Jr., formerly assistant sales manager of the Philadelphia district, succeeds Mr. Blodget as manager of the Boston district.

Flexible Tubing Corp., Guilford, Conn., has named Reed A. Weyburn as representative-distributor sales, assisting A. H. Loux, manager, distributor sales. Prior to joining Flexible Tubing, Mr. Weyburn was with the Connecticut Light & Power Co. for 7 yr.

Gardner-Denver Co., Quincy, Ill., has appointed Robert G. Caldwell district manager of its branch office in Atlanta, Ga., replacing H. G. Little, who has bought an interest in the Central Machinery Co., of Miami, a Gardner-Denver distributor. Mr. Caldwell has been associated with Gardner-Denver for the past 12 yr as a salesman in the Texas territories.

John Davies has been promoted to

WILLSON
plastic protective equipment

keep on the safe side

wear WILLSON MONOGOGGLES®

Workers wear Willson protective equipment willingly because these Mono-Goggles® and other safety devices shown are lightweight and comfortable. Mono-Goggles® illustrated above are available in flexible Polythene and fully transparent Acetate for extra side vision. Interchangeable lenses in clear plastic or Tru-Hue green. Ask for Willson—the leading line of respiratory and eye safety equipment for industry, farm and home use.

Choice of clear or green plastic visors

WILLSON PROTECTO-SHIELD®
gives full face protection with a choice of 4", 6" and 8" visors. Ideal for many industrial operations. Also available with full flare at sides for extra protection against chemical splash.

Weighs less than an ounce!

WILLSON FEATHERSPEC®
. . . specially designed for light-duty operations. Comfortably worn over prescription glasses. Their clear or Tru-Hue green plastic lenses can be switched in a few seconds.

See your Willson distributor or write for bulletin
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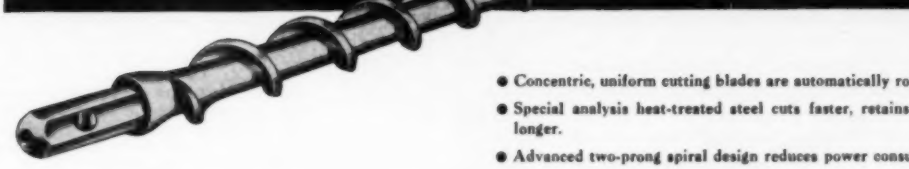
239 Washington St., Reading, Pennsylvania



Coalmaster "1046" Drill Bit for 1⅞" Holes
. . . Teamed with Spir-L-Weld Auger . . .
Gives Longer, Faster, Cleaner Service

- Concentric, uniform cutting blades are automatically rotary ground
- Special analysis heat-treated steel cuts faster, retains sharp edge longer.
- Advanced two-prong spiral design reduces power consumption.
- One-piece solid shank assures longer life.
- Quick-change bit fits into detachable or weld-on type drill head of Series 0875 "Matched Set" auger.

SPIR-L-WELD AUGER FEATURES

- High Tensile Alloy Steel Tubing
- Light Weight with Rigidity
- Uniform Pitch
- Spir-L-Welded to Core
- Maximum Conveyance with Minimum Flight Drag

Order from your nearest Coalmaster distributor

- **Austin Powder Co.** Cleveland, Ohio
- **The Buda Co.** Harvey, Ill.
- **Diamond Supply Co., Inc.** Evansville, Ind.
- **Dooley Brothers** Peoria, Ill.
- **Drillmaster Supply Co.** Evansville, Ind.
- **Fairmont Supply Co.** Fairmont, W. Va.—Washington, Pa.
- **Illinois Powder Mfg. Co.** St. Louis; Salt Lake City
- **Joy Manufacturing Co.** Main Office, Pittsburgh, Pa. Representatives throughout the world
- **Mobile Drilling, Inc.** Indianapolis, Ind.
- **Salem Tool Company** Salem, Ohio

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The exact depth of surface hardening is one of the most important factors in the exclusive PITTSBURGH **Armored Gear** formula. The metal, machining, and overall heat-treating are very important in the long service life of PITTSBURGH GEARS, and with surface hardening to the correct depth for the use the gears will be put to, you can expect unusually long service.

PITTSBURGH **Armored Gears** are guaranteed to give five times the life of untreated gears, one to one and one-half the life of oil-treated gears, and equal or longer life than any other gear in identical service. **Armored Gears** are quickly identified by their distinctive corrosion preventive coating of "**Pittsburgh Purple.**"

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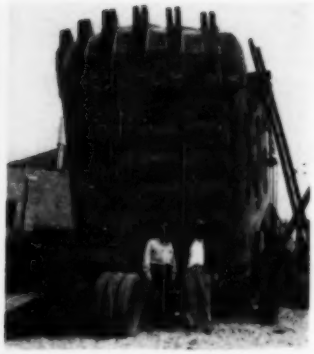

COAL MEN ON THE JOB . . .

Hanna Coal Co., Div. of Pittsburgh Consolidation Coal

BRUCE MEYERS (left), master mechanic for field shovel operations, and Carl Rogers, service superintendent, Georgetown No. 12 mine, pose in front of a new 50-cu yd bucket built for the company by Lukens Weld for use on a Marion 5561 shovel.

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assistant chief engineer, Eaton Mfg. Co.'s Axle Div., Cleveland, following the recent death of Harry H. Hooker. Chester D. Christie, who will assume many of the duties previously handled by Mr. Davies, has been appointed staff engineer. Mr. Davies joined Eaton's Axle Div. as a draftsman in 1923 and in 1945 was appointed assistant to Mr. Hooker. Mr. Christie joined the service department in 1939 and since 1946 has been technical service engineer.

Stephen T. Orr, vice president, Wyandotte Chemicals Corp., Wyandotte, Mich., for 25 yr in charge of the company's manufacturing and operating activities, has been made a member of the president's staff with the rank of vice president. He has been succeeded in his manufacturing responsibilities by Frank Wolcott, his immediate assistant, who becomes general manager of manufacturing, Michigan Alkali Div.

Westinghouse Electric Corp. will soon expand its manufacturing operations in the Boston area with a $1,250,000 building project at its Sturtevant Div. plant in Hyde Park, Mass., which manufactures air-conditioning equipment, commercial fans and blowers. The new structure is expected to provide needed space in which to expand but also an opportunity to make more efficient use of existing areas. Total employment at the Hyde Park plant will reach approximately 2,200 when the new facilities are fully manned, it is reported.

Harnischfeger Corp., Milwaukee, last month officially opened its new sales office, warehouse and service station in Birmingham, Ala. With the new facil-

LIMA type 2400

Lima Type 2400, equipped with 120 ft. boom, and 6 cu. yd. bucket.

SHOVEL
CRANE
DRAGLINE

FOR OPEN PIT MINING, QUARRIES and HEAVY CONSTRUCTION

The LIMA Type 2400 is a big, full mechanical clutch type shovel, dragline and crane with a combination of power, speed and stamina that gives complete satisfaction in all classes of work. It has been given the acid test for high output in rock and fast profitable operation in coal or metal mining. You will recognize at a glance, its heavy-duty engineering which means fewer delays on the job. You will like the smooth, efficient power that flows from its big husky diesel engine; the friction free drums and shafts that rotate on anti-friction bearings and the ease of control through air actuated clutches. These advantages and many more all add up to performance that pays off with fewer delays and bigger profits. You will like the Type 2400—6 yd. Shovel, 110 Ton Crane.

Baldwin-Lima-Hamilton Corporation
Construction Equipment Division
Lima, Ohio, U.S.A.

CAPACITIES: Shovels ¾ to 6 cu. yds. Cranes to 110 tons. Draglines, variable

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OFFICES IN PRINCIPAL CITIES OF THE WORLD

BALDWIN-LIMA-HAMILTON

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • TRUCK CRANES

"We maintenance men go for Blackhawk wrenches!"

BLACKHAWK WRENCHES DESIGNED FOR INDUSTRY
Sail "Treasure Chest" — either 70R (67 wrenches) or 90R (87 wrenches).

Compare for yourself

Lay a Blackhawk Wrench next to an ordinary tool. You'll spot the extra quality in a flash. The Blackhawk Wrench is thinner, better balanced. You'll find that these and many other quality features add up to more work done more easily. Blackhawk Mfg. Co., Dept. W-45112, Milwaukee 1, Wis.

Big Blackhawk sets put new speed and safety into maintenance

ABOVE and below the ground, Blackhawk Wrenches pay a dividend in faster, safer maintenance of coal mining and preparation machinery. Tool for tool — every gleaming, silver-bright wrench in this "Treasure Chest" holds instant appeal for any professional. But we warn you — once they've used Blackhawk Wrenches, they'll never again be satisfied with ordinary tools. Order Blackhawk Wrenches from leading supply houses.

BLACKHAWK

WRENCHES *designed for* INDUSTRY

ities, all territory formerly served by P&H offices in Memphis, Tenn., and Jacksonville, Fla., in which Harnischfeger will retain sales representation, will be consolidated to centralize major functions in Birmingham, thus providing customers with larger warehousing facilities and more extensive service accommodations. Moving up from Memphis district manager to take charge of the new plant and territory is Ray M. Calkins, a veteran of 28 yr with Harnischfeger. The new warehouse and service station will occupy an area of 10,000 sq ft and are connected with a modern sales office of 1,500 sq ft, located on a 4-acre site in the Broyles area of Birmingham at 1629 Vanderbilt Rd.

Hyster Co., Portland, Ore., has transferred the industrial truck sales and service departments of its eastern division to Danville from Peoria, Ill., in a move to increase the efficiency of its sales and service operations. The new sales offices, housed in a modern newly completed office building adjacent to the manufacturing plant, covers 40 states east of the Rockies.

In a move to further diversify its manufacturing operations, H. K. Porter Co., Inc., Pittsburgh, has acquired the Watson-Stillman Co., Roselle, N. J., manufacturers of forged-steel fitting and hydraulic equipment. Operations at Watson-Stillman will continue under the direction of Edwin A. Stillman, president, as a division of H. K. Porter Co., Inc.

General Electric Co. has begun construction of a $1,690,000 service shop and warehouse in Philadelphia to meet the needs of customers in eastern Pennsylvania, southern New Jersey and Delaware. The modern 130,000-sq ft one-story structure is expected to be G.E.'s largest and best equipped service facility when it is completed next May and will be capable of handling transportation, utility and industrial apparatus.

The Dow Corning Silicone Exposition has resumed its tour of showings in leading industrial areas of the country after being completely refreshed and refinished during a 3-mo "summer vacation." Open only to executive, engineering and technical personnel, the exposition is designed to show the remarkable properties and usefulness of silicones, and is said to be the most comprehensive display on the subject ever assembled.

Use Conveyors Underground?

84 CATALOGS on underground conveyors, parts and accessories are listed in the special literature digest beginning on p 124. The postage-free card facing that page will bring you any of them—without charge or obligation. Just write in the numbers of the ones that interest you, fill in card and mail.

THE IMPROVED

Exide-Ironclad BATTERY

YOUR BEST POWER BUY AT ANY PRICE

Because it assures you rapid, high production haulage, more trips per shift . . . high maintained voltage, with uniform speed to end of shift . . . high availability . . . low operating costs . . . low maintenance costs . . . low depreciation costs . . . safety from hazards of fire and fumes.

Some of the many outstanding features

The long-life grids now contain corrosion-resistant SILVIUM. New polyethylene insulating bar seals bottom of tubes and retains active material—thus maintaining high battery capacity for a longer working life. Improved negative plates. New sealing compound. Seamless shock-proof jar. New unbreakable plastic vent plugs.

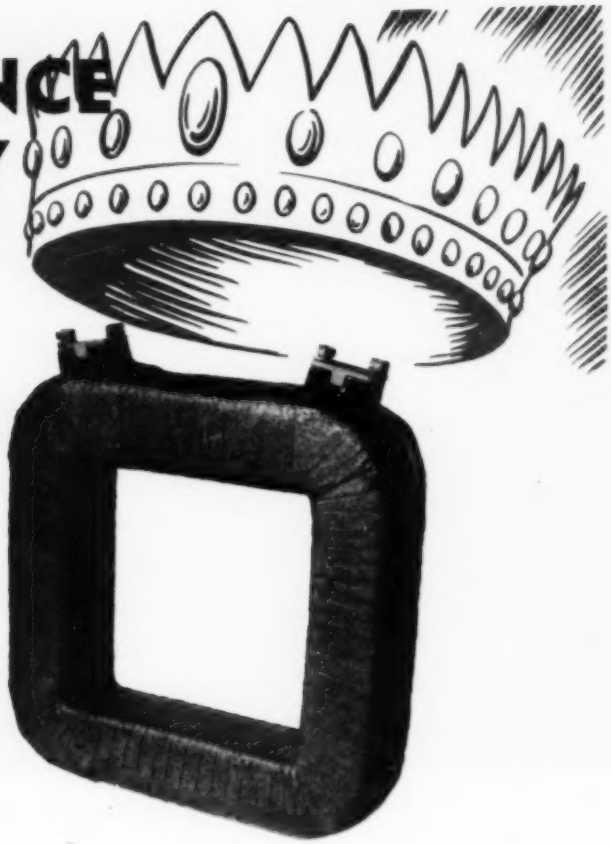
Types, sizes and capacities for battery-electric mine haulage units of every make.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2
Exide Batteries of Canada, Limited, Toronto

"EXIDE-IRONCLAD" and "SILVIUM" *Reg. T.M. U.S. Pat. Off.*

1888 . . . DEPENDABLE BATTERIES FOR 64 YEARS . . . 1952

EXPERIENCE
QUALITY
SERVICE



Manufacturers of
ARMATURE COILS — FIELD COILS
BRASSES — JOURNAL BOXES
REPLACEMENT PARTS FOR
MINING MACHINERY
AND LOCOMOTIVES

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Field coils made by us are tops. The workmanship and quality material built into each coil for the mining industry assures you of long life for this rugged service.

Don't scrap your burned out flat wire fields. We can save you money by rewinding and reinsulating them.

Eight well stocked warehouses, strategically located, provide quick, efficient sources of supply.

WEST VIRGINIA ARMATURE COMPANY
BLUEFIELD . . . WILLIAMSON
West Virginia

BRANCHES

Mine Supplies, Inc., Montgomery, W. Va.
Central Electric Repair Co., Fairmont, W. Va.
Service Machine & Electric, Grundy, Virginia
McDowell Armature & Machine Works, Welch, W. Va.
Kentucky-West Virginia Armature Co., Whitesburg, Ky.
American Armature & Engineering Co., Mullens, W.Va.

NEW Cedarapids Built by IOWA Schrock Motorized HEAD PULLEYS

SIMPLIFY EVERY BELT CONVEYOR AND BELT-BUCKET ELEVATOR INSTALLATION

IT'S COMPLETELY DIFFERENT FROM CONVENTIONAL CONVEYOR DRIVES

Everything is contained **INSIDE** the pulley!

ELIMINATES ALL MAINTENANCE ON SPROCKETS, CHAINS, JACK-SHAFTS, V-BELTS, ETC.

U.S. Pat. No. 2548399 Others Pending

WHAT A *Motorized* HEAD PULLEY IS

THIS is a revolutionary departure from the conventional types of conveyor drives. A *motorized* head pulley is a fabricated steel pulley with *everything*... electric motor, reduction gears and all moving parts . . . contained inside the drum! It's simply a new application of the long-proven gear reduction drive, and because of its simplicity, it's the answer to the maintenance man's prayer. 70% to 90% of conveyor down time is saved by eliminating all countershafts, speed reducers, sprockets, chains, Universal shaft drive and other parts necessary with conventional pulley drives. Motorized Head Pulleys are simple to install and flexible in use, completely interchangeable and adaptable to all types of belt and belt-bucket conveyor installations. By means of a simple adapter, a single pulley can be utilized in any of several belt locations, operating various widths of belt, or changing from larger or smaller horsepower. Pulley sizes range from 5 to 30 HP and are available in various widths. A Motorized Head Pulley is safe, because there are no sprockets, chains, jack-shafts, V-belts, etc. to endanger personnel. It's compact... requires no more room than a conventional pulley. Complete protection from weather, grit and dirt also reduces maintenance. Cedarapids Schrock Motorized Head Pulleys have been job-tested for many years under severest working conditions.

HOW IT WORKS

The pulley shell rotates about the electric motor, which is held stationary by means of a torque arm attached to the conveyor frame. The speed of the shell depends upon the combined reduction ratio of the various pinions and gears contained within the pulley shell. This reduction starts with a primary pinion mounted on the motor shaft and ends in the ring gear attached to the shell. The shell in turn then drives the conveyor belt. Leads to the motor enter the head pulley through a hollow conduit passing through the drum end bell and bearing. A simple oil bath gear compartment provides a lubricating bath for the reduction gears and front motor bearing. Motor and head pulley are cooled and ventilated by holes in the drum.

GET COMPLETE DETAILS TODAY

Find out all the advantages of converting your conveyor installations to motorized efficiency before you need head pulley replacements. One internationally known company has 50 Motorized Head Pulleys installed on widespread conveyor operations, and plans more for every installation that requires replacement. Get complete details about every feature. See your distributor today, or write direct to Iowa Manufacturing Company.

IOWA MANUFACTURING CO.
Cedar Rapids, Iowa, U.S.A.

Built for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah and Washington.

YUBA MANUFACTURING CO.
Pulley & Sprocket Dept., Benicia, California

CINCINNATI DUPLEX CHAIN AND BIT

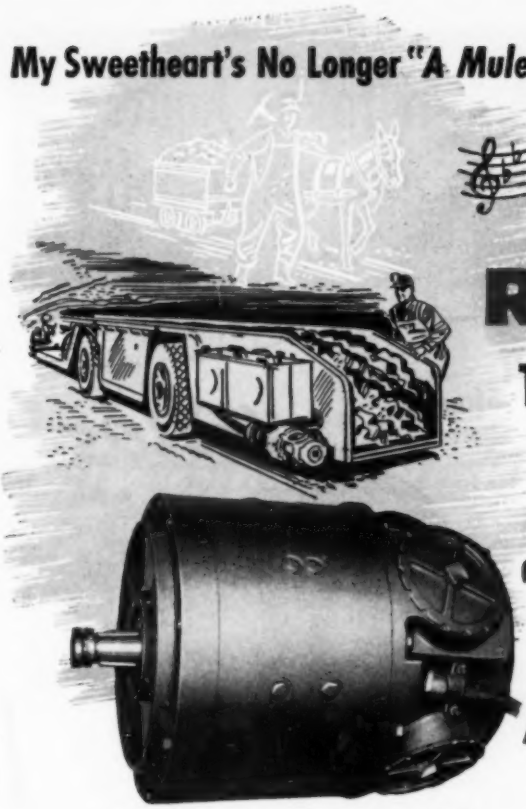
RUGGED DEPENDABILITY

always our GOAL!

Cincinnati Coal Cutting Equipment has enjoyed an enviable reputation for more than a quarter of a century for rugged dependability under all cutting conditions. It has always been Cincinnati's goal and always will be to produce dependable equipment that has *what it takes* to out-cut . . . out-last and out-perform all other cutter chains, bits and bars. And, dependability with Cincinnati Mine doesn't stop with its equipment . . . there's a plus factor that involves a Personalized Service starting at the Home Office and including conveniently located Cincinnati Mine Representatives always at your service. Why not profit from our many years of experience . . . let us hear from you.

the **CINCINNATI MINE MACHINERY CO.**
CINCINNATI 25, OHIO

My Sweetheart's No Longer "A Mule in The Mine"...



IT'S THE RELIANCE TYPE 'T' HEAVY DUTY

"The Toughest Motor Ever Built!"

Reliance Totally-enclosed, Non-ventilated, Explosion-proof Motor; one of several Reliance motor types especially developed for the mining industry.

Wise operators nowadays provide their miners with dependable, economical Reliance Type 'T' Heavy Duty Motors. These rugged motors power 95% of all rubber-tired underground haulage... 70% of all coal loaders... and increasing numbers of other underground machines performing the toughest jobs in mining.

Type 'T' motors embody refinements developed by Reliance engineers working closely with users in the application of thousands of motors to the coal-mining industry. Especially designed, electrically and mechanically, for difficult underground jobs, Reliance motors have vital parts thoroughly protected against coal dust, moisture and other hazards encountered in the toughest mining jobs. They *stay* clean and dry... last longer with less maintenance.

The result... you enjoy exceptional freedom from tonnage losses due to motor failures.

Reliance Type 'T' Motors are available in ratings from ¾ to 100 hp. to meet standards of the Bureau of Mines for use on "permissible" equipment. Low height and compact design satisfy space limitations of underground applications.

Next time you order new equipment, specify Reliance. See for yourself how these *tough* motors keep production up... and costs down.

Write for Bulletin C-2001 describing the complete line of Reliance Type 'T' Motors through 1000 hp.

RELIANCE ELECTRIC AND ENGINEERING CO.

1091 Ivanhoe Road, Cleveland 10, Ohio • Sales Representatives in Principal Cities

What do you do when it takes hours... sometimes days... to change v-belts?

1 **Put one or several maintenance men on the job**

...and pay for repairs while production stands still

2 **Pay overtime**

...and have repair costs eat away your profits

3 **Standardize on VEELOS...**

...and change belts in up to 1/10th the time
...save labor, save time and save overtime
...keep machines producing for maximum profit

Comparison proves the value of VEELOS...

Minimum Inventory—4 reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts. If you use only one width of v-belt you can stock just one reel of Veelos.

Quick Installation—link construction makes it unnecessary to remove outboard bearings.

Complete Adjustability—vibrationless, full power delivery is assured because uniform tension on each belt in a matched set can be maintained.

VEELOS DATA BOOK

gives complete details on construction, installation and uses. We'll gladly send you a free copy of this 28-page fact-full book... write today.

MANHEIM MANUFACTURING & BELTING COMPANY
614 Manbei St., Manheim, Pa.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also in double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

Carrying the ball coal

. . . for the world's greatest production team!

Central's Part on "The Big 11." The 11 states New York Central serves produce about 75% of America's coal and 60% of its manufactures. That makes Central's biggest carrying job the all-weather movement of coal from mine to mill, to vast new electric generating plants . . . and to millions of coal-heated homes.

28,000 New Coal Cars. To do its vast job, New York Central has ordered 28,000 new coal cars since 1945. Three-quarters of them are here *now*. And, whether you ship or use coal, that means cars enough to meet your needs.

Central's Direct Routes and Connections link the mine fields of Illinois, Indiana, Kentucky, Ohio, Maryland, Pennsylvania, Tennessee, Virginia and West Virginia with the newest, most strategic Great Lakes coal docks . . . and with the largest coal-using centers.

CALL ON "CENTRAL" COAL REPRESENTATIVES FOR HELP: H. L. WILLARD, Coal Traffic Manager, New York 17, N. Y.; P. P. BELITZ, Coal Traffic Manager, Cleveland, Ohio; R. K. HORTON, General Coal Freight Agent, New York 17, N. Y.; F. P. SOEN, General Coal Freight Agent, Chicago, Ill.; P. J. SCHWEIBINZ, General Coal Freight Agent, Pittsburgh, Pa.; A. W. BEHRENS, General Coal Freight Agent, Detroit, Mich.; G. W. CHILDERS, General Coal Freight Agent, Cincinnati, Ohio.

NEW YORK CENTRAL SYSTEM

New York Central

The Water Level Route

Total Weight ..... 2,410,000 lbs.
Dipper Capacity ..... 25 cu. yds.
Dipper Weight (full load) 130,000 lbs.

WHITMORE'S

Whitmore's Pressure-Proof lubricants have been serving the mining industry for more than half a century

These quality lubricants are manufactured to stand up under severe operating conditions.

Pressure-Proof lubricants will give you more tons per dollar.

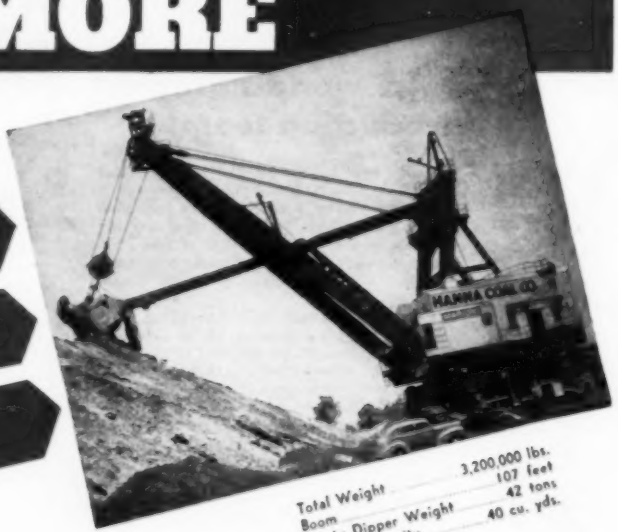
Care LUBRICATED by WHITMORE

WHITMORE'S

Whitmore lubricates the world's largest shovels.

Whitmore lubricates the world's largest draglines.

Investigate and compare.



Total Weight ..... 3,200,000 lbs.
Boom ..... 107 feet
Empty Dipper Weight ..... 42 tons
Dipper Capacity ..... 40 cu. yds.

WHITMORE'S
PRESSURE-PROOF
LUBRICANTS
SUPER E.P.

THE WHITMORE MFG. CO., *Factory and General Offices*, CLEVELAND 4, OHIO, U. S. A.

YARDLEY PIPE and fittings

...the brand with *all* the features!

Lighter Weight
200 feet of Yardley flexible M-1 in 2" size weighs only 87 lbs. compared to 730 lbs. for steel in the same size.

Faster Installation
Saves time and labor. Long, flexible lengths uncoil quickly around curves and through crevices. Only needed tools are a screw driver and hand saw.

Longer Lasting
Made of specially-compounded materials guaranteed not to rot, rust, corrode or scale. Absolutely unaffected by acid or alkaline water.

Less Friction
Smoother walls and fewer fittings increase discharge more than 25% as proved by actual tests made by independent engineers.

Lower Cost
Economy in installation, longer service life, greater efficiency, less power consumption make Yardley Pipe cost less in the long run.

Complete Line
Yardley makes both flexible and rigid pipe in a full range of sizes, for corrosive drainage, fresh water, suction or high pressure use. Know the reputation and facilities of your source of supply.

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THIS FREE BOOK ON SAFE CAR COUPLERS

• You can't beat *safe* American Couplers for today's big cars and longer trains. Heads are husky, one-piece steel castings which *enclose and protect* locking parts. Buffing exerts no side pressure. It is taken by sturdy flanges, without impact on the lock. Pull is transmitted through steel-to-steel contacts—*not* through the lock pivot pins.

SELF-CENTERING, SELF-LEVELING . . . WON'T "SNAG"

You get extra-wide gathering range—5" axial displacement or 60° angularity, *horizontally;* 2⅞" displacement or 18° angularity, *vertically.* Locks grip tightly—prevent slack and costly wear. You can rotary-dump *without* uncoupling; unlock from either side. Get the utmost in safety and savings now! *Standardize on* American Automatic Mine Car Couplers.

ALWAYS READY TO COUPLE

Any two heads couple—and they're always ready to couple, because locks pivot freely in uncoupled heads. Movement of lock-control bar remains unrestricted until flanges of two heads come together.

HOW AMERICAN COUPLERS LOCK

WON'T "CREEP"

As pivoted locks swing into engagement, each control bar drops to lock against the flange of opposite head.

LOCK-SET FOR UNCOUPLING

Lifting and pulling either control bar unlocks the coupler and holds lock in lock-set position until heads move apart.

Safe...Sure AMERICAN MINE CAR COUPLERS

AMERICAN STEEL FOUNDRIES, 410 N. MICHIGAN AVE., CHICAGO 11, ILL.

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READERS MAY CONTACT THE CONSULTANTS

with the confidence justified by the offering of these special services nationally.
Whose Cards Appear on This Page

NO!

Here, conventional U-Bolt clips are properly applied but rope is distorted and subject to life-shortening strains under load.

NO!

Inexperienced workmen can easily put conventional U-Bolt clips on incorrectly with saddles not on load-line. Result: Weakened rope — risk of accidents.

It CAN'T Go On Wrong

Both halves of the Laughlin Safety "Fist Grip"* clip are identical. There is no wrong way. The most careless workman can't put 'em on wrong (unless he forgets to tighten the nuts). And they're not only safer and practically foolproof, but they're a darn sight easier to use.

Here's why:

Nuts are out in the open, can be tightened with any wrench, and don't have to be "inched around."

Bolt ends are shorter and don't get battered or bent. Nuts are always easy to remove when clip is to be re-used.

No crushed rope ends, under "Fist-Grips" to cut off. Rope saved.

Fewer clips are required in many installations, so there is less work to do.

"Fist-Grip" Clips are just one example of many LAUGHLIN EXCLUSIVES in design, safety and quality that make Laughlin your best buy in wire rope and chain fittings.

Look for the trademark *to be sure*

THE THOMAS LAUGHLIN COMPANY
117 FORE ST., PORTLAND, MAINE

LAUGHLIN

THE MOST COMPLETE LINE OF WIRE ROPE AND CHAIN FITTINGS

*Patented, T.M. Reg.

Lighter . . . TOUGHER

COFFING CHALLENGER SPUR-GEAR HOIST

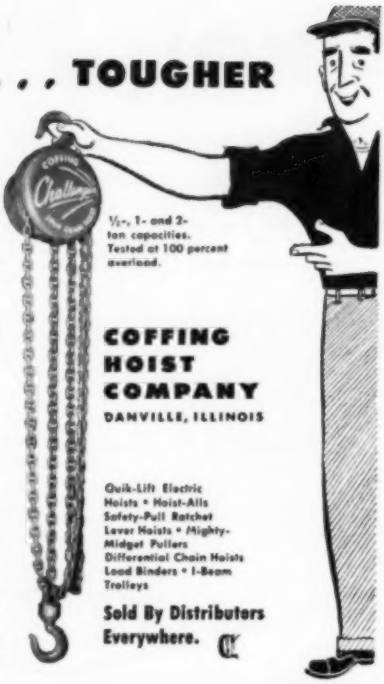
Never before such easy portability and rugged, shock-resisting strength in a spur-gear hoist . . . never such simplicity of design and ease of servicing.

Light weight—carry it in one hand; set it up anywhere. One-ton model weighs only 39½ lbs.

All Steel—even the housing. Takes shock loads and impact as only steel can.

Easy to Service—may be completely disassembled in minutes with ordinary tools. Simplest spur-gear hoist ever built.

Find out how this better spur-gear hoist can improve operations and save expense for you. Write for bulletin G11CH.



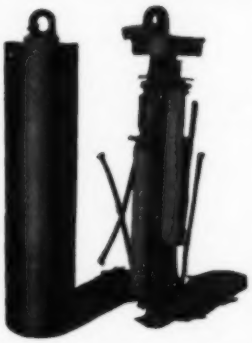
½-, 1- and 2-ton capacities. Tested at 100 percent overload.

COFFING HOIST COMPANY
DANVILLE, ILLINOIS

Quik-Lift Electric Hoists • Hoist-Alls Safety-Pull Ratchet Lever Hoists • Mighty-Midget Pullers Differential Chain Hoists Load Binders • I-Beam Trolleys

Sold By Distributors Everywhere.

SHUTTLE CAR RESISTORS



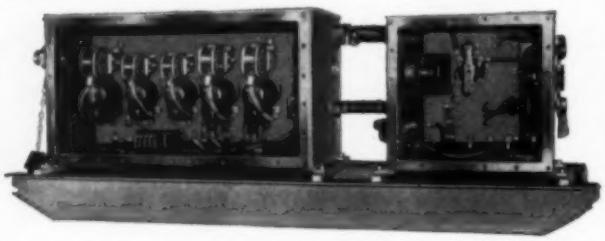
Illustrated, GUYAN replacement elements for permissible shuttle-car traction motors . . . fits in original case and mountings. Resistor available for all type shuttle car traction and reel motors.

GUYAN MACHINERY COMPANY
LOGAN, WEST VIRGINIA

Try us for long-lived, trouble-free resistors.

NEW ENSIGN-CLARK

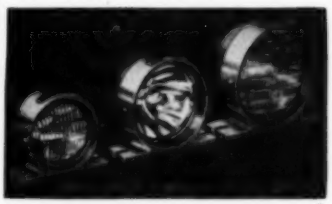
EXPLOSION TESTED STARTER FOR TWO SPEED BELT CONVEYOR MOTOR



Photograph illustrates 50/25 H.P. Bulletin 5392 Type ADJR starter — reversing — 230V D.C. for two-speed motor operation. Bureau of Mines explosion tested enclosure. Four points acceleration. Skid mounted.

1. Adjustable speed 2 to 1 ratio when used with adjustable speed motor.
2. Full field on starting.
3. Three position selector switch provides independent or sequence operation.
4. Interlock on reversing switch provides half speed only on reverse.
5. Field accelerating relay provides speed-up from remote push-button for shuttle car loading.

ENSIGN ELECTRIC & MFG. CO.
914 ADAMS AVENUE — HUNTINGTON, W. VA.



GUYAN *Sealed Beam* HEADLIGHTS for MINE EQUIPMENT

GUYAN Sealed Beam Headlights are made in three sizes to meet various mining conditions. The voltage rating is 6 volts for all three types. To operate from 250 or 500 volt trolley voltage we can furnish either a resistor or a power unit.

Type 4 IN is recommended for gathering locomotives, shuttle cars and loading machines.

Type M1 for main line locomotives has a narrow, powerful beam (70,000 beam C.P.)

Type 7 IN is a utility headlight using standard automobile lamp, two filaments, to project the beam either close or far.

Write for Bulletin

GUYAN MACHINERY CO.
LOGAN . . . . West Virginia

Now . . . 2 New

AO COVERGLAS GOGGLES

Fit Over Safety
And Personal Glasses

NEW
Safety
Goggles

#326

#327

NEW — 4 WAYS!

1. New Cup Size and Shape
2. New Lens Size and Shape
3. New Side Shields
4. New Easy Lens Replacement

AO's newest development in eye protection—Chippers' and Welders' Coverglas Goggles—can be worn over practically every pair of personal glasses (even the biggest frames) and most types of safety prescription goggles *with and without side shield.*

Wider vision, too, because the lenses are larger and scientifically designed to give up to 20% more vision. Yet, with all these features the goggles weigh but a fraction of an ounce more than ordinary Coverglas goggles . . . cost only slightly more.

These goggles are the newest . . . and two of the greatest . . . developments since the advent of safety goggles. Get all the facts about these two outstanding Coverglas goggles from your AO MSA Representative. He can supply you.

QUICK FACTS

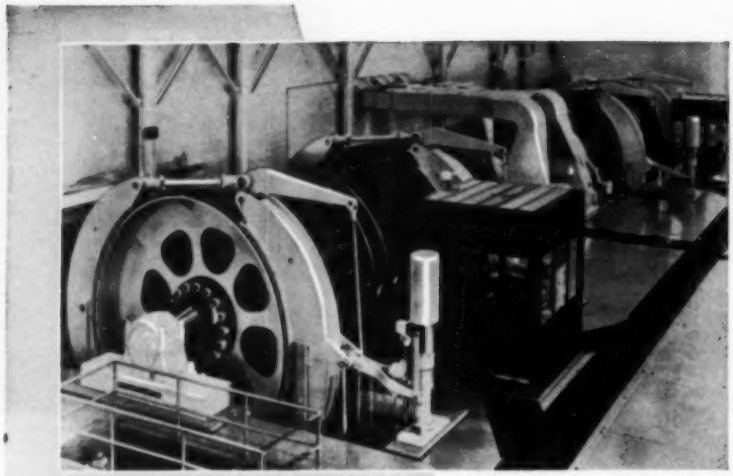
- Lens easily replaceable from rear (not front) by means of a spring clamp—no tools needed
- Lightweight, brown plastic cups fit face snugly, won't conduct heat or electricity
- Light-tight side shields for welders (on No. 327 goggle) provide indirect ventilation
- Bridge—High-grade leather. Instant adjustment
- AO worker-lab tests show much greater field of vision and increased comfort
- All-rubber headband, easily adjustable

"326" Chippers' Coverglas goggle supplied with regular Super Armorplate lenses. "327" Welders' Coverglas goggle supplied with regular Noviweld lenses and cover lenses.

AO's Industrial Vision Program Increases Production, Decreases Accidents. Write today for booklet "Improved Industrial Vision" to 1111 Vision Park, Southbridge, Mass.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES



GOOD NORDBERG JOB leads to a better one

Nordberg Mfg. Co. installed a hoist at Cleveland Cliffs Iron Co's Ishpeming mines in 1942. So successful was this application that they were called upon to supply two additional hoists for another shaft at the same installation.

These two new hoists—one for ore, the other for men and materials—have drums constructed of forged and rolled steel plate welded into one piece, providing a smoothly operating, uniformly grooved surface for winding the 25,600 ft. of 1⅞" wire rope.

SKF's role in the success of this installation is a big one—because the drum shafts as well as the pinion shafts are mounted on SKF self-aligning Spherical Roller Bearing Pillow Blocks.

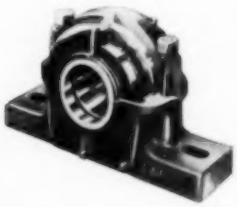
SKF EQUIPPED

In the Cleveland-Cliffs installation, SKF bearings permitted considerable reduction of the length of the drum shaft, and provided minimum starting friction under repeated start-and-stop operation.

In every industry, SKF Spherical Roller Bearings are known for the fact that they are completely self-aligning; that their full capacity is always available for useful work; that they set the pace for rugged performance.

All industry knows, too, that it can depend on SKF *engineering* cooperation in the design of more efficient equipment.

SKF INDUSTRIES INC., PHILADELPHIA 32, PA. — *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.* 7310



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THE C-E RAYMOND SYSTEM

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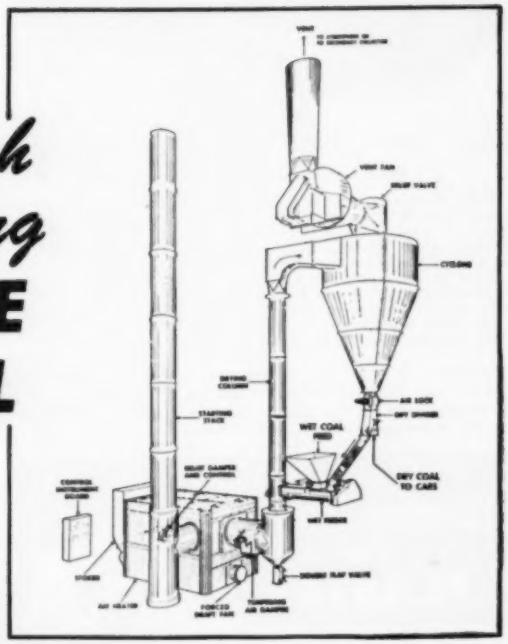
Flash Drying FINE COAL

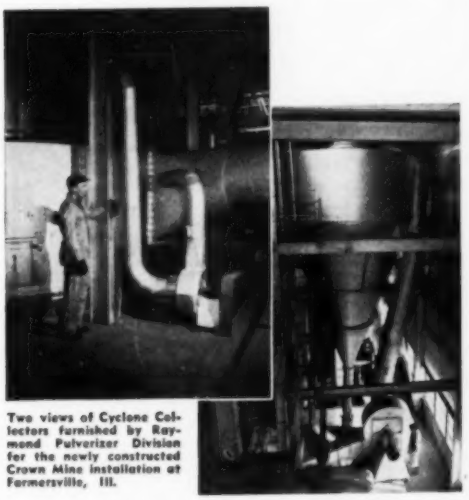
UNIFORMITY

FLEXIBILITY

ECONOMY

SAFETY





Two views of Cyclone Collectors furnished by Raymond Pulverizer Division for the newly constructed Crown Mine installation at Farmersville, Ill.

There are practical reasons why more and more coal cleaning plants, of both large and small capacity, are adopting the C-E Raymond System of Flash Drying.

Units of equipment are easy to install to fit existing plant layout without extensive alterations.

Close control is assured over final moisture content of finished product.

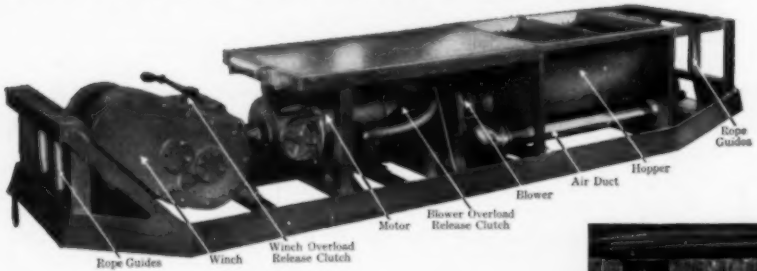
Automatic handling of the material in an enclosed, dustless system insures safe, low-cost operation.

The C-E Raymond System is set up for producing required grades of coal from ⅜" down to the lowest mesh coal made. A single drying column has a range of 10 to 75 tons per hour. Multiple columns may be connected to a single furnace for still higher capacities.

COMBUSTION ENGINEERING – SUPERHEATER, INC.

Flash dryer division

"FOR SAFETY'S SAKE" every mine should have
THE "LITTLE CHIEF" *DUST*RIBUTOR



Supplied with or without winch . . . with or without wheels.

Ideal for "low" mines . . . and small mines

New, mobile and portable. "Heap big power dusting job," through 50 to 250 feet 1¼" hose . . . mounted on carriage, or with winch on skids . . . pulls itself on and off cars and conveyor belts . . . travels on skids 40 feet per minute, can be supplied without winch. May be had dust tight or Bureau of Mines approved, permissible with trolley tap or permissible plug for use of shuttle car.

Dusts continuously . . . no "resting"

Length (with winch) 8'-6"; length (less winch) 7'-0"; height on skids 18"; width 20"; weight (with winch) 825 lbs., weight (less winch) 630 lbs.; hopper —capacity 2½ sacks; motor—5 H.P., 1750 R.P.M. compound wound; voltages available—90, 230, 550 D.C., 220-440 A.C.; dusting capacity—35 to 50 lbs. p.m. dry rockdust; bearings, motor, blower, winch, conveyor—anti-friction. Safety overload releases; quick hose attachment.

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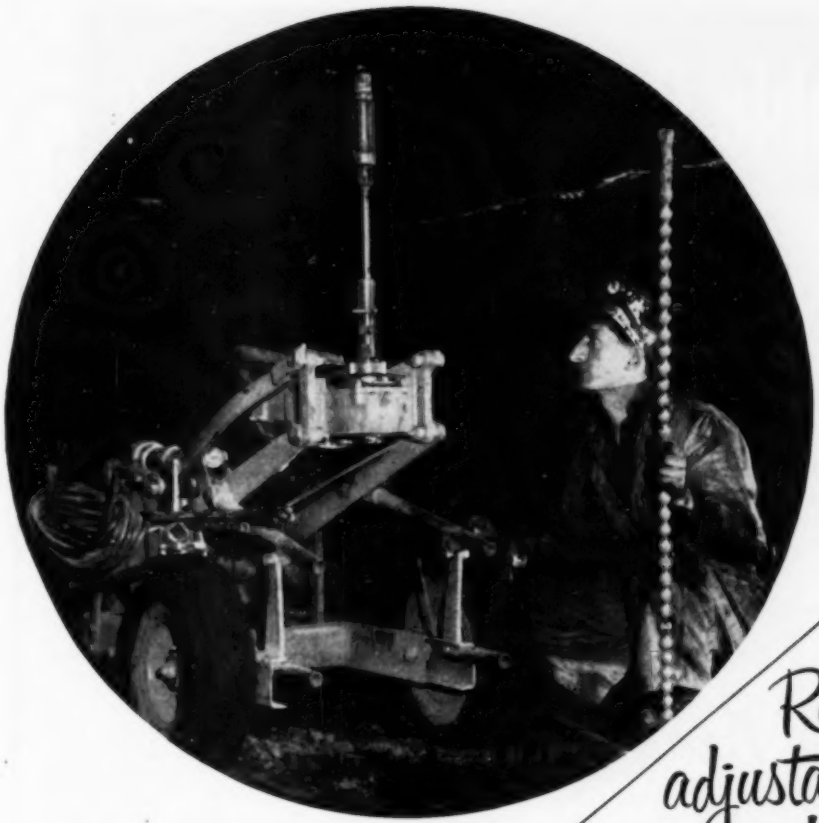
(SEAL) ELVA G. MASLIN.

(My commission expires March 30, 1954)

Nw. Coal Age—58308



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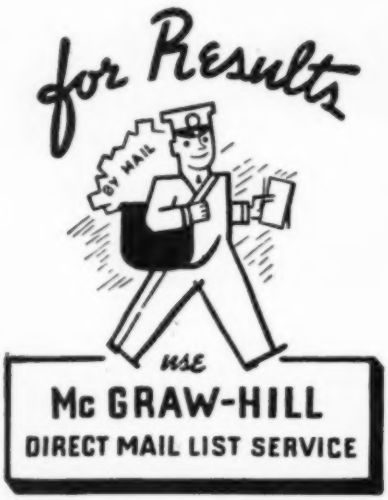

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3
. . . OR LOSE MONEY WHEN THEY DON'T
4
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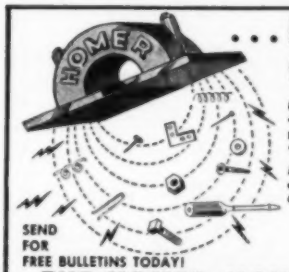

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1—2 ton Whitcomb, battery, 24" ga.
1—4½ ton Goodman, Trolley, 36" ga.
1—5 ton Jeffrey, trolley, 36" ga.
1—6 ton Goodman, trolley, 36" ga.
1—3 ton Whitcomb, gasoline, 24" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—30" x 16" Williams Pulverizer
1—36" x 40" Jeffrey Double Roll.
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

2—5 HP Brownie Room Hoists
3— 5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box single drum
1—600 HP Box single drum

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutters
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

2—8BU Joy loaders
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
6—Jeffrey Aerodyne midget permissible blowers
3—Jeffrey Aerodyne midget blowers

SCALES

1—100 ton Fairbanks railroad scale
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—20 ton Fairbanks springless dial type truck scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

3—50 ton capacity steel bins
2—100 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Link Belt bucket elevator, 50' centers, 18" x 10" x 9" buckets
1—Link Belt bucket elevator, 50' centers, 10" x 6" x 6" buckets
1—Link Belt bucket elevator, 60' centers, 6" x 4" x 4" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8" centers, 36" wide
1—Jeffrey Drag Conveyor, 88'6" centers, 36" flights
1—Jeffrey Drag Conveyor, 72' centers, 30" flights
1—Jeffrey Drag Conveyor, 67' centers, 30" flights
1—Jeffrey Drag Conveyor, 69'6" centers, 28" flights
1—Link Belt Drag Conveyor, 50' centers, 15" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 40' centers
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

12400#—weatherproof single conductor wire, 350000 CM
3600'—300000 CM wire
16600'—#4 rubber covered single conductor, 600V
3800'—#5 Parkway cable, 3 con., 7200 volt
2977'—#8 Parkway cable, 3 con., 7200 volt
1368'—#10 Parkway cable, 3 con., 7200 volt
547'—#2 3-conductor Tirex, 600 volt
3400'—#6 3 con., Tirex, 600 volt
1000'—#12 4-con., Tirex, 600 volt
12700'—1/0 rubber covered 1 con., 600 volt
3842#—#2 solid bare copper hard drawn
1725#—#4 solid bare copper hard drawn
6000'—1/0 solid bare copper hard drawn

PIT CARS

125—60 cu. ft. Card steel coal mine cars, 36" ga.
88—66 cu. ft. Card steel coal mine cars, 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42D5.

RAIL

16, 20, 30, 40, 52, 60, and 80# relaying rail in stock

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2 complete tipple buildings and machinery, each capable of 1000 to 1500 tons per day production

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1—500 KW G.E. Syn. 275 V. 900 RPM
1—400 KW G.E. Syn. 575 V. 720 RPM
1—300 KW G.E. Syn. 275 V. 1200 RPM
2—100 KW WEST. Syn. 275 V. 1200 RPM
1—400 KW RIDGWAY Syn. 275 V. 1200 RPM
1—200 KW G.E. Syn. 275 V. 1200 RPM
1—200 KW RIDGWAY Syn. 275 V. 900 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM
1—100 KW RIDGWAY Syn. 275 V. 1200 RPM

ROTARY CONVERTERS

2—500 KW G. E. Syn. 275 V. 1200 RPM
1—400 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW G. E. Syn. 275 V. 1200 RPM
1—300 KW WEST. Syn. 275 V. 1200 RPM
1—150 KW G. E. Syn. 275 V. 1200 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM

NEW G. E. RECTIFIER

1—200 KW G.E. Sealed Ignitron Rectifier, Mining Stationary Type, 2300/4000 V. AC. 275 V. DC. Complete with AC Switchgear Cubicle, Rectifier Cubicle and DC Switchgear Cubicle. Equipment is throat connected to the main 235 KVA Rectifier Transformer. Rectifier Model #GRP40CAA30. Complete with water and air heat exchangers. Power Transformer and all other necessary accessories. Unit has never been in service.

LOCOMOTIVES

2—30 T JEFFREY 250 V. 3-MH-77, 48-36" Ga.
1—25 T G.E. 500/250 V. 3-HM-824-A, 44-36" Ga.
1—20 T JEFFREY 250 V. MH-77, 48-36" Ga.
1—20 T G.E. 250 V. (Tandem) HM-809, 36" Ga.
1—15 T JEFFREY 250 V. MH-110, 48-36" Ga.
1—11 T JEFFREY 500 V. MH-110, 48-36" Ga.
1—10 T JEFFREY 250 V. MH-2110, 48-30" Ga.
2—8 T JEFFREY 250 V. MH-100, 44-30" Ga.
1—10 T WEST. 250 V. ML-907-C 36" Ga.
2—10 T GOODMAN 250 V. 36-B, 36" Ga.
2—8 T JEFFREY 250 V. MH-100, 42-36" Ga.
2—8 T WEST. 250 V. ML-908-C, 44-36" Ga.
2—6 T WEST. 250 V. ML-925-LK, 24" Ga.
2—6 T JEFFREY 250 V. MH-88, 44-36" Ga.
2—6 T JEFFREY 500 V. MH-88, 44-36" Ga.
2—4 T GOODMAN 250 V. MS-4-E, 30-24" Ga.

LOCOMOTIVE MOTORS

2—JEFFREY 250 V. MH-77, Ball Bearing
2—WEST. 250 V. ML-908-C, Ball Bearing
2—WEST. 250 V. ML-906-C, Ball Bearing
2—WEST. 250 V. ML-904-R, Ball Bearing
2—G.E. 500/250 V. HM-824-A, Ball Bearing
4—WEST. 80 V. V-49-X, Ball Bearing
Extra Armatures Available for Above Motors

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Prices on Request

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149E BROADWAY
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LOCOMOTIVES

5—13 ton Jeffrey MH-110, 250 D.C. 42" Ga.
1—20 ton Jeffrey MH-110, 250 DC, 42" Ga.
3—8 ton Jeffrey MH-100 250 DC 42" ga.
2—6 ton Jeffrey MH-88
4—6 ton Mancha Battery Type 48 cell, C-61-6 mtrs 42" ga.
5—13 ton G.E. 42" ga.
20—6 ton Goodman, 42" ga.
1—8 ton Goodman, 42" ga.
3—15 ton Westinghouse, 42" ga.
6—5 ton GE Battery, 36" ga. (with batteries)
1—5 ton Mancha Battery, 36" (with batteries)
2—12 ton Jeffrey, 42" ga.
2—12 ton GE, 42"
6—5 ton GE Battery, 42"
2—12 ton Goodman, 42" ga.

LOADING MACHINES

25—Joy Loaders, 250 DC, 42" ga. 7 & 5 BU
2—Joy Continuous Miners, 250 DC

CUTTING MACHINES

10—Goodman Shortwall Cutting Machines

COAL DRILLS

17—Chgo-Pneu. post mtd'd coal drills, AC & DC
50—Type 473 Denley Bros. Elec. Coal Drills

MINE & SHUTTLE CARS

150—4 ton steel mine cars, 42" ga. 'E dump
25—Joy shuttle cars, 42D
200—3 ton 42" ga. ACF Mine cars, Timken
200—2½ ton ditto
10—Charging panels for shuttle car batteries

GENERATORS

1—2000 KVA Westinghouse 2400 V generator, comp.
1—1500 KW Allis Chalmers 2400 V Generator, comp.
1—700 KVA GE
3—150 KW Westinghouse MG set 2300 V.
1—100 KW GE
1—75 Westinghouse MG set

CONVEYORS

1—36" SA Conveyor with 150 HP drive, 2000'
6—Joy Elev. conveyors, type PL-11-2E

CAR SHAKEOUT & HOISTS

1—6 ton heavy duty L.B. car shakeout with 6 ton elec. hoist for 220/440
1—Hewitt-Robbins heavy duty Shakeout A.C.

TIPPLE

1—6 track tipple comp. with shaker & boom

MINE AND SLOPE HOISTS

3—12000± Wellman Sgl Drum 4'x5' F hoists with 150 HP motors, starters, safety control, 250 V DC
1—10000± Clyde DC
1—26,000± Nordberg Sgl Drum
1—11,000± Wellman Sgl Drum AC
1— 7,000± Ottumwa Sgl Drum AC

CARPULLERS AND LOADERS

1—10,000± Link Belt Capstan Carspotter new
1— 5,000± Jeffrey Carspotter AC
1— 5,000± Link Belt Carspotter AC
1—20,000± Amer. Hoist Carspotter AC
1—20,000 LB Endless puller

CRUSHERS AND MISC.

1—36x36 Jeffrey Sgl Roll
1—12x16 Eagle Dbl Roll
1—18x20 Eagle Dbl Roll
1—420' x 20" SA Comb. Scraper & Bucket Conveyor or w/o Mtr. Ideal for tipple or dock.
2—24"x60' SA Porta. conveyors AC motor
1—(New) Nolan Porta-Feeder
4—Joy Caterpillar Y-1E Mining Machine Trucks

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CAR DUMP: Will dump 100 ton cap., 60 ft., standard gauge, coal cars with 3 hoppers.

COMPRESSOR: Worthington DC2, 29/18½ x 21, motor 600 H.P. synchronous, 440 volt, with all auxiliary equipment.

CLAM SHELL BUCKETS: 2—Class E, material handling, 2½ yd. capacity, weight 7800 lbs.

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REAL BARGAINS

2—6BU Joy Loaders, 250 Volts. Rebuilt.
1—12BU Joy Loader, 250 Volts. Good Condition.
1—150 KW Westinghouse Rotary Converter, 2300-275 V.
1—100 KW G. E. Syns. M. G. Set, 2300-275 V. Rebuilt.
1—8½ ton Ironton Battery Locomotive, any gage.
2—3SB or BB Jeffrey Shortwalls, 250 Volt — With or without trucks. Rebuilt.
2—7AU Sullivan Universal Track Mounted, 250 V.
1—2BU Jeffrey Universal, 250 Volt.
2—6 ton Jeffrey MH88 Locomotives, any gage.
1—60" x 48" Single Drum Connellsville Slope Hoist—5000' of ¾ rope.
3—75 KVA Allis-Chalmers Transformers, 2300/4160 Volts — 220/440 Volts.
1—60 HP Westinghouse DC Motor, SK125L, 250 Volt, 1750 RPM. Rebuilt.

TIPPINS MACHINERY CO.
Pittsburgh 6, Penna.

RAILS-TIES
TRACK ACCESSORIES

1—Model 70 Atlas portable flight type conveyor, 27' center. Price $2,305.00

1—30/36" McCarthy Coal Recovery Drill with JXD Hercules 6 cylinder gasoline engine also equipped with 25 30" diameter by 6' long augers 2 30" Diameter Lump Heads and all necessary tools Price $15,017.40

All the above equipment is new and used for demonstration on one job. Discount will be given.

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ELECTRIC STRIPPING SHOVEL

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300 KW Ridgway Motor Generator Set

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ALL COMPLETELY REBUILT
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All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches, ties and cars.

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DRAGLINE FOR SALE

Bucyrus-Monighon 1150-B Walker, electric, 180' boom, 25-yd. bucket, new 1949, A-1 condition, 4000 volts, located Midwest. Now operating, immediate release.

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IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — FREE, WATER, SUCTION, AIR, STEAM AND WELL HOSE

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We have 8 to 48

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TOUGH COVERS—heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.
STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.
FLEXIBILITY — Carefull attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily, runs true on all idlers, gauge resistant, excellent for long and short hauls and slope installations.

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We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	6	1/8"	1/16"	32 Oz.

INQUIRE FOR SIZES NOT LISTED. ELEVATOR TRANSMISSION & V-BELTING ALSO IN STOCK

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30 INCH 1-126′ — 1-270′ — 2-350′ — 1-418′ — 2-500′ — 1-1100′ & 2-1500′ Long.
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42 INCH 1-144′ — 1-290′ — 1-377′ — 1-575′ — 2-700′ — 1-888′ — 2-1500′ Long.

Extra Idlers—Terminals—Belts

STEEL STORAGE TANKS

26—8,000-10,000 & 20,000 Gal. Cap.

LOCOMOTIVES

20 TON WHITCOMB GASOLENE
65 TON G.E. DIESEL ELECTRIC
2—100 TON G.E. DIESEL ELEC.

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Sullivan 11-B and 7-B, latest types.
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Jeffrey 35-L, 29-L, 29-C, 29-B
Shortwall, Arcwall & Slabbers.

COPPER TROLLEY AND FEEDER WIRE
3 Conductor 2/0, 6000 Volt Cable.
4/0, 6/0, 9 section, 500,000 CM, 750,000 CM, 350,000 CM and 4/0 stranded. Other sizes also.

LOADING AND CONVEYING EQUIPMENT
1 Joy low pedestal 14 BU Loader.
1 Joy medium pedestal Loader.
1 Joy 8 BU Loader, 33½" High.
1 Jeffrey 61 CLR Loader.
2 Myers Whaley Mo. 3 Automat Loaders.
2 Joy cable reel Shuttle Cars.
1 Joy T-2 low pan Cat Truck.
6 Joy Ladel Shaker Conveyors.
2 Joy Belt Feeders, PL-12.
1 Joy 20" Chain Conveyor, 300'.
1 Jeffrey 61 WH, 15° Chain Conveyor, 300'.
5 Jeffrey 61 AM, 12" Room Conveyors, 300'.
2 Jeffrey 61 HG Face Conveyors.
1 Joy 30" Underground Belt Conveyor, 500'.
3 Barber Greene 24" x 50' portable Belt Conveyors.
1 Quickway Truck Shovel.
1 Insley Crawler Shovel.

LOCOMOTIVES (all track gauges)
3 Jeffrey MH-7B, 10 ton Locomotives, 2 in tandem.
12 Jeffrey MH-8B, 6 ton Locomotives, 3 in tandem.
(large stock of parts & supplies for above)
2 Goodman 8 ton, 28" above rail.
3 Goodman 4 ton, 24" above rail.
3 Westinghouse 904, 6 ton, bar steel frame.
1 G. E. 4 ton, 24" above rail.
(Most of the above have motor driven reels)
1 Gas 4 ton—2 Diesels 16 & 20 ton.

MINE CARS
80 End Dump, 48" Ga. 30" above rail.
30 End Dump, 48" Ga. 20" above rail. All steel.
25 Drop Bottom, 44" Ga. 24" above rail.
20 End Dump, 42" Ga., 30" above rail.

MISCELLANEOUS
6—8,000 Ga. Tank Car Tanks.
5000 Five Gallon G. I. gas and water cans.
Relaying Rails, 400 tons, 20, 30, and 40 lb.
Steel Mine Ties, 42", 44" and 48" Ga. 20#, 30#, 40# and 60#.
Coal Crushers, Wilmot & Pittsburgh.
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New Westinghouse Tandem Hydraulic Control Assembly for 6 to 10 ton Locomotive.

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1 GMC Diesel, 75 KW, 275 volts.
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1 Motor Generator 150 KW, 275 v.
4 Rotary Converters, 150, 200, & 300 KW, 275 volts. 2300 and 6900 primary volts.

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"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
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MOTOR GENERATOR SETS

750 KW A.C.h. 250 v. 720R-Syn. 2300/440 v.
400 KW West. 550 v. 720R-Syn.-SK 2300/4000 v.
2—300 KW West., 275 v. 1200R-Syn. 2300 v.
300 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
300 KW Ridg. 275 v. 1200R-Syn. 2300 v.
300 KW West. 550 v., 1200R-Syn.-SK 2300 v.
200 KW West. 275 v. 1200R-SK-CW 2300 v.
200 KW G.E. 275 v. 1200-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
200 KW West. 275 v. 900 R. SK-Syn. 2300 v.
200 KW G.E. 125 v. 1200 R MPC-ATI 2300/4000 v.
150 KW G.E. 275 v. 1200 R. MPC-ATI 2300/4000 v.
150 KW West. 275 v. 1200R-Syn.-SK 2300 v.
150 KW G.E. 550 v. 900 vR-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
100 KW Burke 250 v. 900 R-Syn. 220 v.
55 KW G.E. 125 v. 1730 R. RC-KT 220/440 v.
15 KW Ideal 120 v. 1750R. D-A 220/440 v.

ROTARY CONVERTERS

500 KW West. 275 v. 1200 R. 2200/4000
2—500 KW G.E. 250 v. HCC6-1200R. 13,200 v.
400 KW West 250/125 v. 1200R. 13,860/2200/4000
300 KW G.E. 275 v. HCC6-1200R. 2200/4000 v.
300 KW G.E. 275 V. HC12-600 R. 2200/4000
200 KW G.E. 275 v. HCC6-1200R. 2200/4000 v.
150 KW G.E. 275 v. HCC6-1200R. 2200/4000 v.
150 KW West. 275 v. 1200R. 2200/4000 v.
Will rewind transformers to your specifications.

LOCOMOTIVES AND CUTTING MACHINES

20 Ton Jeff 250 v. 44" Ga. MH77
13 Ton Jeff 250 v. 36/48" Ga. MH110
10 Ton Jeff 250 v. 36/48" MH110
8 Ton Goodman 250/550 v. 42"/44" ga.
6 Ton Westgh. 250 v. 36" Ga. 904
2—6 Ton G.E. 250 v. 20½" ga.
5 Ton Greensburg Bat. Loco.—Philco Bat.
6—5 Ton Goodman 30B 250 v. 42/44"
35 B Jeff. 250 v. Permissible
12 G3 Goodman Shortwall 220/3/60
55 BB Jeff. A.C. permissible
3—12A Goodman Shortwall 50HP Motor 230 v.

AC MOTORS

HP	MAKE	SPEED	TYPE	VOLTS
400	G.E.	450	IM	S.R.
300	G.E.	450	WT	S.R.
150	G.E.	600	ATI	Syn.
2—100	G.E.	450	IM	S.R.
100	West.	900		Syn.
100	West.	1200	CR	S.C.
75	West.	1200	CR	S.C.
50	G.E.	1750	KT	S.C.
50	G.E.	900	KT	S.C.
40	G.E.	900	MT	S.R.
30	G.E.	900	KT	S.C.
30	G.E.	1200	KT	S.C.
20	West.	1200	CR	S.C.
15	West.	1750	CR	S.C.

Many smaller units in stock.

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All Equipment From Abandoned Coal Mine

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29—42" Gauge Locomotives, 230 Volt D.C., 15-8-6 Tons.

LOADING MACHINES

13—8 BU Joy Loading Machines, 230 Volt D.C.

CUTTING MACHINES

10—Jeffrey 29-B Arcwall cutting machines, 230 Volt D.C.
6—Jeffrey 35-B shortwall cutting machines 230 Volt D.C.
2—Goodman 112 Universal Shortwalls.

SUBSTATIONS AND LINES

5—150 KW Rotary Converters,
2—150 KW Motor Generators.
60—Tons 4-0 and 6-0 Wire.
2½ Miles 2300 Volt Surface Lines.
6—800 Amp I-T-E Circuit Breakers—Automatic.

HOISTS

7—Slope and Shaft Hoists.

CARS

300—Wood mine cars, 42" gauge—Timken bearings.

PUMPS

25—Centrifugal pumps—various sizes.
20—Piston and plunger pumps—various sizes.

MOTORS

30—Motors, 230 Volt D.C., various sizes.
30—Motors, 220-440 Volt A.C., various sizes.

ROOF BOLTING EQUIPMENT

Cleveland Stoper, Impact Wrench and 1200 1" x 60" Roof Bolts, complete with wedges, nuts, etc.

Miscellaneous Supplies, Tools and Repair Parts • Preparation Plant

1—5 Track tipple, complete with Jeffrey Baum Jig Washery.

All equipment located at Chauncey, Athens County, Ohio

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CHAUNCEY, OHIO

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FOR SALE—MINING & MACHINERY EQUIPMENT

RECTIFIER
(complete with all auxiliaries)
Westinghouse Ignitron Rectifier—continuous Rating 300 K.W. 275V—D.C.—Amps.—1090 D.C. (New in 1944)

M. G. SETS type S.K.
Westinghouse Synchronous Motor 438 H.P.-D.C. Gen.—300 K. W.
Westinghouse Synchronous Motor—220 H.P. 88 Cyc. 3 Ph. 1290 R.P.M. Output 2200 V.
Westinghouse—150 K.W. 275V-545A.-1200 R.P.M. with switchboard-relay and oil circuit breakers and panel boards complete

ROTARY CONVERTER
Westinghouse Synchronous Converter 200 K. W. 250 V. D.C. 800 AMP D.C. 1200 R.P.M.—60 cycle —6 phase complete with controls and all accessories.

COMPLETE POWER PLANT
4—800 H.P. Water tube boilers. New operating. Foster Superheaters and Riley Spreader Type Stokers complete

TURBINE GENERATORS
American Brown Boveri 3 PH. 2300V. 5100-KVA output speed 3600 cont. to 175 H.P. G.E. Synchronous Motor—3 ph. 60 cyc. 2300V.
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One electric car puller
One new hoist engine complete with 1⅛" rope 715' long
Link-Belt steam cranes
Vibrator, conveyors, ring crushers, elevators, pumps, blowers and so forth.
Steam turbines and all complementary equipment, presently operating 2300V. 5100 KVA output 60 Cyc. 3600 R.P.M. continuous including transformers, switchboards, motors, condensers, etc.

ELECTRIC TROLLEY LOCOMOTIVES
Out side armor plate frames
Jeffrey Main Line Trolley Loco. 15 ton Blt. 1944 with air brakes
G.E. Main Line Trolley Loco. 13 ton
Jeffrey Main Line Trolley Loco. 15 ton
G.E. Main Line Trolley Loco. 10 ton
Jeffrey Main Line Trolley Loco. 10 Ton built 1945

TRANSFORMERS
5 KVA to 667 KVA

COAL WASHING PLANT
COMPLETE. PRACTICALLY NEW McNally-Norton of Pittsburgh CAP. 100 Ton per hr.

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Lee-Norse Koalmobiles (Shuttle Cars) equipped with elevating conveyors to load coal into mine cars. Type K.M.C. 46A-46A4-46B-2

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New 1950 Litchfield—24" x 30" — 2' — 9' Step Up Drums
2—1⅛" ropes 715' long

CUTTING MACHINES
7 BI SULLIVAN 9' Bar 250V-D. C. equipped with Joy Bug Duster mounted on caterpillar trucks—built 1944-47.
Type 1-3E (2 brand new — never used)
CE&T Bolivan 7-½ ft. Bar Type—TI-3E & TI-1E
30 H.P. 250 V.D.C. trackmounted on Joy Caterpillar

LOADING MACHINES (42" gauge)
5 B. U. Joy Machine 35 H. P. 250V 122 AMP.

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ELECTRIC CAR PULLERS
Western Electric Induction Motor 52 H.P. 600 R.P.M. 440V. 70 Amp—3PH—60 cys. Type —
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COAL MINE MACHINERY CO.

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4—WESTINGHOUSE — 150 KW 3-BRG. FACTORY SETS, 225 H.P. 2300V—3-60 1200 RPM, Type SK, 275 V-D.C.

Rotary—Converters

2—1000-KW GE 650 Volt D.C. 6-Phase—60 Cycle Interpole. 427 Volt AC. Transformers Available. Will Give 300 Volts DC with input of 220 Volts AC. 500 KW.
1—West. 500 KW, 575 VOLT, 6-Phase, 60 Cycle, 900 RPM.

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A.C. and Direct Currents, 115/230 VOLT. All sizes from ½ HP to 300 HP. Speed from 300 RPM to 3600 RPM, Compound and Shunt. Many sizes in Variable Speeds. Open and T.E.F.C.

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16" belt	6.75	36" belt	8.75
24" belt	7.50	42" belt	9.50
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2190 S. Third Street Columbus, Ohio
PHONES: GArfield 2186; FR. 6-8898, Evenings

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3—200 KW G.E. Syn. 275 V. 1200 RPM
These are 3 phase, 60 cycle, 2300/4000 volt, complete with switchboards and full automatic AC and DC switchgear.

ROTARY CONVERTERS

2—300 KW G.E. Syn. 275 V. 1200 RPM
1—250 KW West. Syn. 275 V. 1200 RPM
2—200 KW G.E. Syn. 275 V. 1200 RPM
1—100 KW G.E. Syn. 275 V. 1200 RPM
These are complete with switchboards, switchgear, and single phase transformers for 2300 volt.
1—250 KW West. Mine Type Rectifier

LOCOMOTIVES, 250 V DC, BALLBEARING

2—20-ton Jeffrey, MH-77
2—15-ton West. 910-C4
2—15-ton West. 908-C
2—15-ton Goodman 36-A
5—15-ton Jeffrey MH-110
2—13-ton G.E. MM-829
4—13-ton G.E. MM-827
2—13-ton Jeffrey MH-110
4—10-ton Goodman 34-B
3—8-ton G.E. MM-819 with reels
4—8-ton G.E. MM-834 with reels
Complete with new Jeffrey steel strip resistances. All have been rebuilt and any part showing any wear was replaced with new. Guaranteed 100 per cent against electrical and mechanical defects.

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1—5-Track Steel Tipple with Link-Belt No. 5035 Washer, 250-300 tons per hour capacity, complete with 4 large loading booms, shaker screens, vibrating screen, and all necessary appurtenances. Like new.

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LOADING MACHINES, 250 V DC

6—14-BU-3PE Joy	5—460 Goodman
4—14-BU-7RBE Joy	2—350 Goodman
6—11-BU Joy	4—260 Goodman
6—8-BU Joy	3—L-600 Jeffrey
10—7-BU Joy	2—L-500 Jeffrey
2—Myers-Whaley No. 3 Automats, practically new.	

AC CUTTING MACHINES — 220/440 V

2—Jeffrey 29-U	5—Goodman 12G3
1—Jeffrey 24-B	5—Goodman 112G3
3—Jeffrey 35-BB	4—Goodman 112G3A
1—Jeffrey 35-L	3—Goodman 112DG3A

PERMISSIBLE TYPE, 250 V DC

6—Jeffrey 29-U on rubber tires	5—Jeffrey 29-UC
	10—Jeffrey 35-BB
3—Jeffrey 29-U cat mounted	4—Jeffrey 35-BC
4—Jeffrey 29-U trank mounted	9—Sullivan 7-B on cats
	6—Goodman 512 on cats

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All types of Hoists from 100 HP to 1200 HP suitable for slope, shaft or drift mines.

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ALL TYPES OF CABLE REEL SHUTTLE CARS, 250 V DC

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FREEPORT SEAM
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1—Westinghouse Ignitron Rectifier, 300 KW. Serial #1-24P223, 3 car.

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Owner—Farland Fuel Corporation

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New and used.

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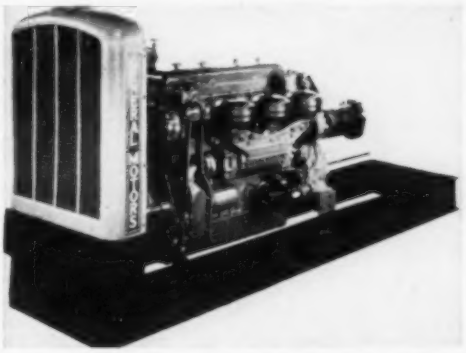

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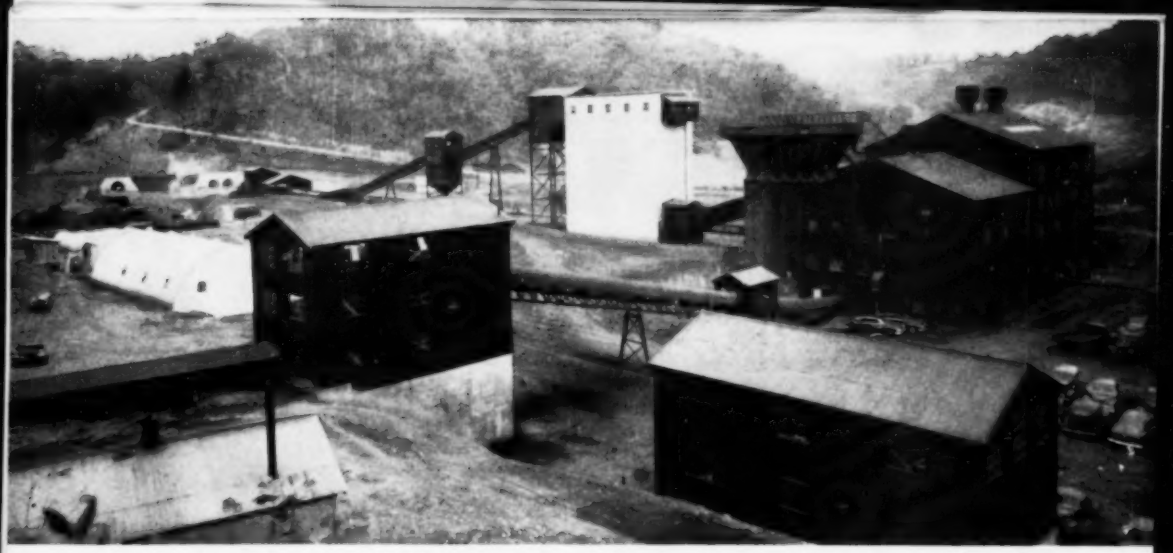

Link-Belt engineered throughout—National Mines' transfer house (left center), washery (top right), blending bins (background).

LINK-BELT's total responsibility is your assurance of the best in coal preparation

National Mines gets high-capacity, low cost per ton at Morgantown, W. Va.

TO PRODUCE coal economically from their Morgantown (W. Va.) mine, National Mines Corp. had a dual problem. Not only did they wish to produce a clean metallurgical coal—free of slate, rock and bone—but they also had to move the coal two miles to a river and rail loading station—through rough country—at lowest possible cost per ton.

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LINK-BELT

COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8, Springs (South Africa). 13.015

Here's what LINK-BELT's total responsibility means to you

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QUALITY EQUIPMENT. Link-Belt itself builds a broad line of coal preparation, handling and power transmitting equipment.

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SATISFACTORY PERFORMANCE. When you rely on Link-Belt as a single source, Link-Belt accepts responsibility for overall operation.